

**SUPPLEMENT PART
NO. 85001-90033**

**USE THIS SUPPLEMENT
WITH DICOM 344
MAINTENANCE MANUAL**

JUNE, 1972

HEWLETT  PACKARD

HP MODEL 85001A
CASSETTE INPUT/OUTPUT UNIT

Supplementary Maintenance Information
To be Used with the DICOM 344 Maintenance Manual

HEWLETT-PACKARD COMPANY
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CONTENTS

SECTION I — INTRODUCTION	1-1
SECTION II — TROUBLESHOOTING GUIDE	2-1
Introduction	2-1
SECTION III — NORMAL OPERATION INDICATIONS	3-1
SECTION IV — 85001A AUTO DIAGNOSTIC	4-1
Introduction	4-1
Loading the 85001A Auto Diagnostic	4-1
Summary of Operation	4-1
Test Cassettes	4-1
Operating Procedure	4-2
Creating Test Cassettes	4-5
Auto Diagnostic Errors	4-5
SECTION V — SWITCH REGISTER DIAGNOSTIC	5-1
Introduction	5-1
Operating Procedure for HP 2100 Computer	5-1
Operating Procedure for HP 2114/2115/2116 Computer	5-2
SECTION VI — SERVICE DIAGRAM DESCRIPTION	6-1
General Description	6-1
On Line Write Mode	6-1
On Line Read Mode	6-2
Search Mode	6-2
SECTION VII — REPLACEABLE PARTS	7-1
Introduction	7-1
Table of Replaceable Parts	7-1
Ordering Information	7-2

APPENDICES

Appendix A — Test Points	A-1
Appendix B — Restoring the Protected Binary Cassette Loader	B-1
Appendix C — Changing Input Decks	C-1
Appendix D — Loading System Tapes	D-1
Appendix E — Loading Absolute Programs Without the EXEC	E-1
Appendix F — Using the EXEC	F-1
Appendix G — IC Base Pinout Diagrams	G-1
Appendix H — 12849A Interface Card	H-1
Appendix I — Cleaning the Tape Path	I-1

ILLUSTRATIONS

Figure 2-1. Troubleshooting Flowchart	2-2
Figure 6-1. Write Mode Waveforms	6-3
Figure 6-2. Read Mode Waveforms	6-3
Figure 6-3. Service Diagram	6-3

TABLES

Table 3-1. Normal Operation Indications	3-1
Table 4-1. Summary of AUTO Diagnostic Tests	4-1
Table 4-2. Standard Test Files	4-1
Table 4-3. Summary of 85001A AUTO Diagnostic Groups	4-2
Table 4-4. Typical Printout, 85001A AUTO Diagnostic	4-4
Table 5-1. Switch Register Control Program (2100)	5-1
Table 5-2. Switch Register Control Program (2114, 2115, 2116)	5-2
Table 5-3. Switch Register Commands	5-3
Table 5-4. 85001A Words	5-4
Table 7-1. Exchange Board Numbers	7-2
Table 7-2. Replaceable Parts	7-3
Table 7-3. Code List of Manufacturers	7-15
Table A-1. Test Points	A-1
Table B-1. Contents of PBCL	B-2
Table C-1. Changing Input Decks	C-1
Table E-1. Error Halts Loading Absolute Tapes	E-1
Table F-1. EXEC Commands	F-1
Table H-1. Cable Wiring	H-1

SECTION I INTRODUCTION

The purpose of this supplement is to aid in servicing the HP 85001A Cassette Input/Output Unit. It contains information not found in the DICOM 344 Interface Reference and Maintenance manuals. Refer to these manuals for clarification of the terms used in this supplement.

This supplement applies to an 85001A used with any Hewlett-Packard 2100-series computer.

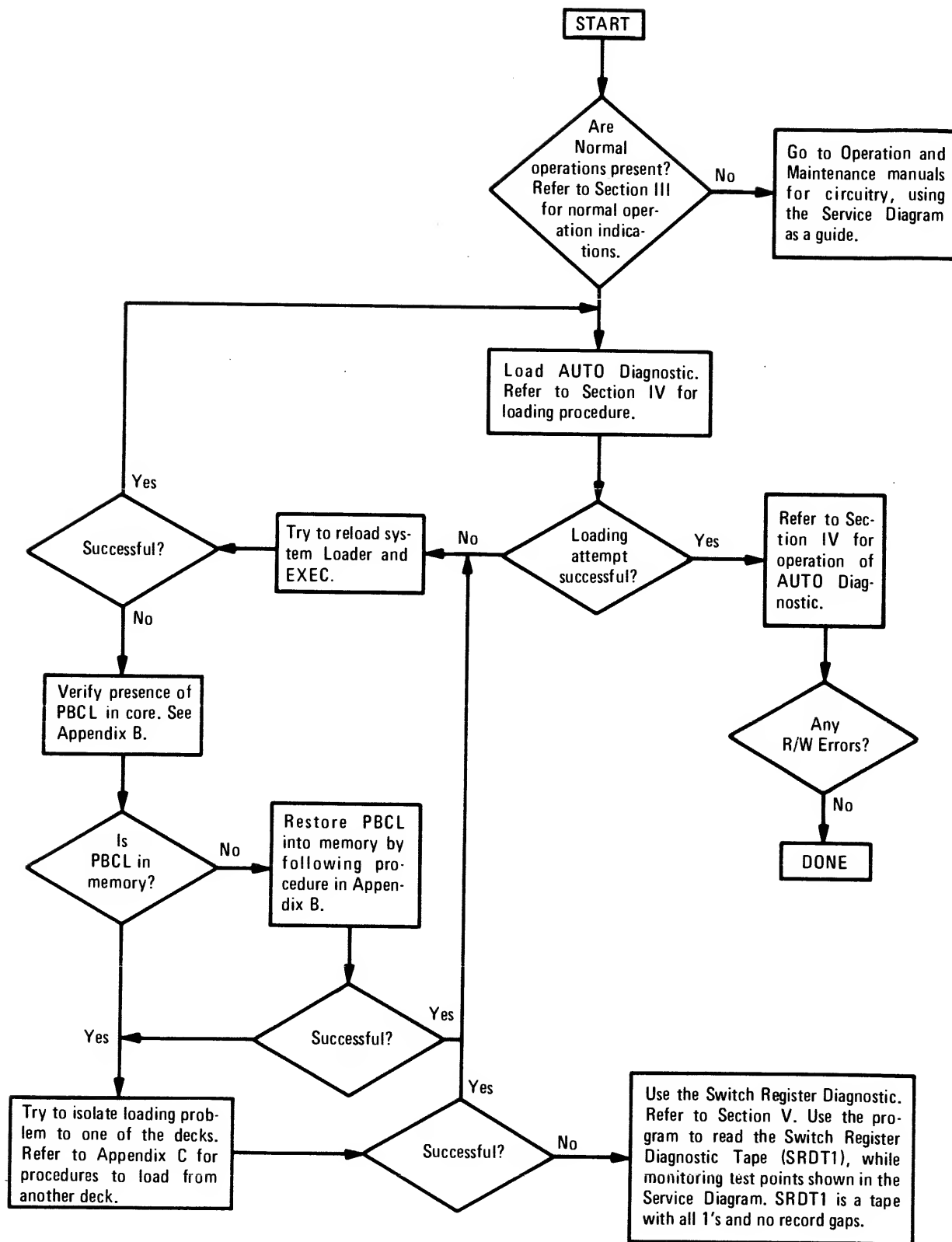
The 85001A Service Diagram (see Section VI) is a valuable guide to troubleshooting the Cassette Input/Output Unit.

SECTION II

TROUBLESHOOTING GUIDE

INTRODUCTION

The flowchart in Figure 2-1 is a rough guide to troubleshooting the 85001A. There are three major software tools for troubleshooting the 85001A—(1) the EXEC program, (2) the AUTO Diagnostic, and (3) the Switch Register Diagnostic.



SECTION III

NORMAL OPERATION INDICATIONS

Table 3-1 shows the front panel indications of normal operation of the 85001A Cassette Input/Output Unit.

Table 3-1. Normal Operation Indications

Sequence	Operator's Action	Normal Operation Indication
1.	Select ON LINE	All front panel controls (except OFF LINE) are disabled.
2.	Insert a blank cassette into a deck; press the loader down, and select HALT mode.	The READY lamp above the deck illuminates.
3.	With deck READY, select OFF LINE mode and then select WRITE.	Tape will be in motion for a couple of seconds (to get past clear leader) and then HALT. The WRITE pushbutton will stay lit until HALT is pushed.
4.	Again select WRITE.	No effect. Again push HALT.
5.	Select READ, then 5 seconds later, push HALT.	Tape will be in motion until HALTED.
6.	Press WRITE and OFF LINE together.	Tape will be in motion for a fraction of a second; deck writes a FILE MARK and HALTs.
7.	Rewind tape by pushing REWIND pushbutton.	Tape will be in motion while rewinding, then will HALT.
8.	Select READ.	Tape will be in motion for 5 seconds (until it encounters the FILE MARK written in step 6). It is normal if the HALT lamp blinks.
9.	Remove cassette and re-insert upside-down (to start at EOT).	Tape will rewind from end-of-tape (EOT) to beginning-of-tape (BOT).

SECTION IV

85001A AUTO DIAGNOSTIC

INTRODUCTION

This section describes the 85001A AUTO Diagnostic. The AUTO Diagnostic fully checks every ON LINE function and deck-to-deck compatibility. It performs these checks in a certain order and communicates with the operator via the print-out device.

LOADING THE 85001A AUTO DIAGNOSTIC

Load the AUTO Diagnostic from deck 1 using the EXEC. Since the AUTO Diagnostic is the third file on the cassette (the first two files are standard test files) the command is LOAD 3 FROM 1. Appendix D contains instructions for using the EXEC, including more general use of the LOAD command.

SUMMARY OF OPERATION

The AUTO Diagnostic makes four separate tests. These tests are outlined in Table 4-1.

Table 4-1. Summary of AUTO Diagnostic Tests

Test 1	Reads two standard test files from test cassette.
Test 2	Skips first file, then reads second file from test cassette.
Test 3	Writes standard test files onto reverse side of test cassette.
Test 5	Checks for write-protect and long rewind.

TEST CASSETTES

The AUTO Diagnostic requires at least one "test cassette". Three such cassettes are needed for a complete check of the unit. The first two files of the Diagnostic Tape are standard test files. They may be used to verify performance on any one deck. That deck can then generate "test cassettes".

A test cassette has two standard test files written on one side, and the write-protect tab removed from that side. The reverse side is blank so that the 85001A can write on it. Table 4-2 describes the two standard test files.

Table 4-2. Standard Test Files

File 1	Contains one record consisting of one 16-bit word, all octal "1"s. The file mark for File 1 is one byte of all binary "1"s.
File 2	Contains twenty records; each record contains 200 words (400 bytes). Starting with 000 and ending with 377, each byte is one octal greater than the preceding one. The file mark for File 2 is one byte of all "O"s.

The AUTO Diagnostic performs the tests in groups; the sequence of tests described in Table 4-3 assumes the operator has selected switches 1, 2, 3, and 5 on the computer's switch register. To perform any of the tests independent of the sequence, select the switch that has the same number as the test to be performed (switch 3 for Test 3, for example).

Table 4-3. Summary of 85001A AUTO Diagnostic Groups

Group 1	Each deck selected runs Tests 1 and 2 (in that order).
Group 2	Each deck selected runs Tests 3, 1, and 2 (in that order). Group 2 may be cycled (looped) by selecting switch 15 also. Test cassettes may be created by running only Test 3.
Group 3	Shift all cassettes — put cassette from Deck 1 into Deck 2, cassette from Deck 2 into Deck 3, and cassette from Deck 3 into Deck 1. Repeats Tests 1 and 2 (in that order).
Group 4	Shift again; If yes, then it repeats Tests 1 and 2 (in that order).
Group 5	Each deck selected runs Test 5.

OPERATING PROCEDURE

The AUTO Diagnostic should be loaded using the EXEC. The starting address is 100 (octal). During program execution, it will pause for operator action (such as loading cassettes, etc.). After the operator action is completed, type a space (CR) to continue. Any time the program is waiting for operator input, you may type CONTROL-C (CR) to bailout and restart the program.

Run the 85001A AUTO Diagnostic as follows:

1. When the AUTO Diagnostic is loaded, it will print PUT TEST #S. IN SW REG (1-5). Select switches 1, 2, 3, and 5 on the computer switch register. Then type a space (CR).
2. The program will print ENTER TEST DK #S. Type in up to three deck numbers in any order (123) (CR).
3. The program will print INSERT GOOD TAPES. Insert test cassettes into the decks to be tested. Type a space (CR).
4. The program will print DK X EOF twice (X will be 1, 2, or 3). The tape will then rewind to beginning-of-tape, and program will print DK X TST 1 DN (meaning that Test 1 on Deck X is completed). The tape will then skip the first file and will read the second. The program will print DK X EOF again, then rewind and print DK X TST 2 DN. It will repeat this procedure for each deck that was selected in step 2.

Since the program tells when each test is completed, any errors may be pinpointed to the proper test.

Step 4 checks all READ and SEARCH functions. If the unit fails these tests, the program should be stopped at this point to find out why. The next series of tests writes on the reverse side of each test cassette, and then reads what was written. If the READ functions are not operating properly there is no way to check the WRITE functions. To stop the AUTO Diagnostic, type CONTROL-C (CR) after it prints INSERT BLANK TAPES.

5. The program will print INSERT BLANK TAPES. Turn the test cassettes over, and re-insert them into the decks. When they have rewound, type a space (CR). The program will write standard test files on each deck selected, and will print DK X TST 3 DN. It will then repeat step 4 to check what it has written.

If switch 15 is selected, this series of tests will repeat until switch 15 is reset. This feature is useful for troubleshooting intermittent problems.

OPERATING PROCEDURE (cont'd)

6. The program will print SHIFT ALL CASSETTES. The operator should move all cassettes to the right (put cassette from Deck 1 into Deck 2, cassette from Deck 2 into Deck 3, and cassette from Deck 3 into Deck 1). Then type a space (CR).

Step 4 is repeated for all decks selected. This tests deck-to-deck compatibility.

7. The program will print SHIFT AGAIN; If no errors occurred in step 6, type a space (CR) to continue without shifting again.

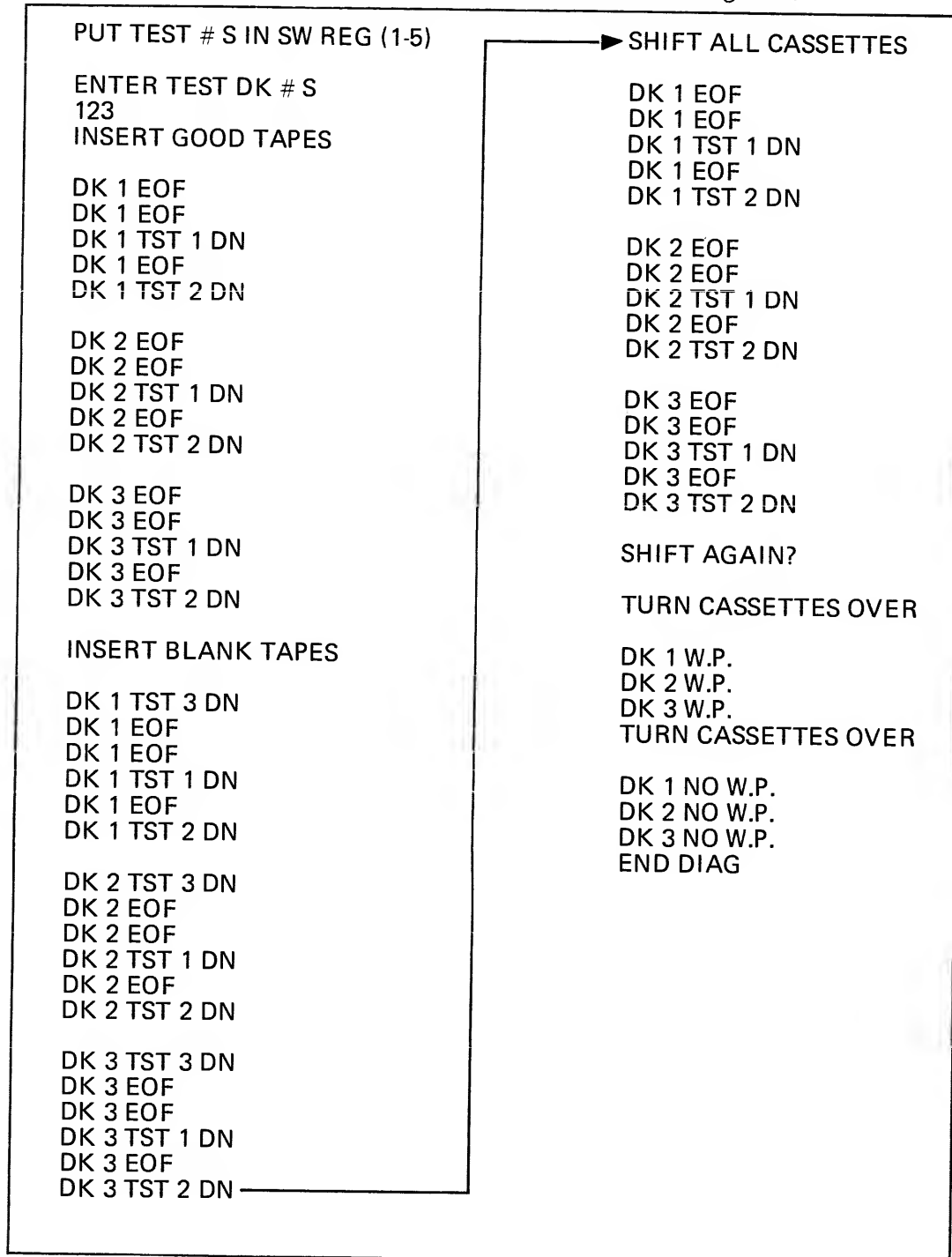
If errors occurred in step 6, a bad deck may be isolated by shifting again. Type YES (CR). For example, if Deck 1 is written on, but when cassette is placed in Deck 2 it cannot be read, the malfunction could be in either 1 or 2. By shifting again to Deck 3, the bad deck may be isolated.

8. The program will print TURN CASSETTES OVER. Remove the cassettes from all decks and turn off power to the 85001A. Turn the test cassettes back over (to the side with the write-protect tab removed) and re-insert them into the decks. Now turn back on the power and type a space (CR). All three decks should start rewinding and should go READY at approximately the same time (within 10 seconds of each other). When they are READY, the program will print DK X W.P. for each deck selected, then print TURN CASSETTES OVER. Turn the test cassettes back over and re-insert them into the decks. When the cassettes rewind, the program will print DK X NO W.P. for each deck.

9. The program will print END DIAG and return to step 1.

Table 4-4 shows a typical printout of the AUTO Diagnostic.

Table 4-4. Typical Printout, 85001A AUTO Diagnostic



CREATING TEST CASSETTES

To create one or more test cassettes, run the AUTO Diagnostic by only selecting Test 3. For each deck selected, the 85001A will write two standard test files for use on other decks.

AUTO DIAGNOSTIC ERRORS

The AUTO Diagnostic will print out errors if any occur. The following list explains these errors and their possible causes:

DK X NOT RDY. The selected deck was not ready. The loader may not be pushed down, the cassette may be rewinding after insertion, or the 85001A may be in OFF LINE. Recovery—Ready the deck, then type a space (CR).

DK X NO LEADER. The selected deck was not on clear leader. If this occurred at the beginning of the program, it may mean that the automatic-rewind-upon-insertion feature did not work. If it occurred during the tests, it means that a rewind was aborted before it was completed. This is usually caused by a warped cassette or a sticky deck stopping the rewind process. If the rewind is stopped for even a short time (200 ms.), the tachometer (used to sense motion) will time out and the deck will go READY. Recovery—Rewind the deck (OFF LINE or by lifting the loader lip) and type a space (CR).

DK X R/W ERR. A read/write error occurred on the selected deck. This error has many possible causes. The most likely cause is a random dropped bit while reading or writing. The method of writing data on the cassette allows for a hardware parity check while the data is read. A read/write error will occur if the 85001A does not read 8 bits per character, or if it reads an odd number of flux reversals. The random error rate of the 85001A should be less than 1 error per 2×10^8 bits. If errors occur more frequently, it is a sign of something wrong in the 85001A or the cassette itself. If a read/write error occurs consistently at one spot in the cassette, the tape may be creased there or the oxide is separated from its mylar backing. If the errors are more random, they may be caused by dirt on the tape path (head or buffer spring/pressure pad), or a mechanical or electrical malfunction in the 85001A. The cassette driver will also indicate a read/write error if the unit is placed in OFF LINE while reading or writing. The driver gives this indication by noting the absence of read status, write status, or deck ready status. Recovery—Type a space (CR) to continue the diagnostic. The driver will truncate the record at the point of the R/W error. Type CONTROL-C (CR) to return to the beginning of the AUTO Diagnostic.

DK X W LKOUT. An attempt was made to write on a cassette with the write-protect tab removed. Recovery—Remove the cassette and insert a non-protected one. Type a space (CR) to continue.

DK X EOT. The cassette was at end-of-tape while trying to perform a read or write operation. Since the AUTO Diagnostic does not try to read or write a complete tape, this error usually means that a cassette was inserted upside down and did not rewind automatically upon insertion. Recovery—Turn cassette over or rewind it.

RECORD X SIZE ERROR. The record #X (X = 1 to 21) that was read from the tape was not the size expected. Record 1 should be one word, and records 2 through 21 should be two-hundred words each. This error message will be followed by "IS" "SHOULD BE", with the actual record size printed under "IS", and the expected size printed under "SHOULD BE".

RECORD X CONTENT ERROR The contents of record X read from the tape did not match the expected contents. The AUTO Diagnostic prints the values read and the expected values in the "IS" "SHOULD BE" format. Patterns in the differences between the expected and actual contents are a valuable clue to the nature of the hardware problem. These errors may be grouped into one of three categories. Printing will stop

and the 85001A will move on to the next record by selecting switch 0 on the computer's switch register.

A.	IS	SHOULD BE	
	000	004	This pattern represents one bit missing (bit 2). Since the 85001A is internally a serial device and this is a parallel problem, the I/O card or cable is probably at fault.
	001	005	
	002	006	
	003	007	
	010	014	
	011	015	
B.	IS	SHOULD BE	
	001	000	This pattern may be caused by slow up to speed on read or by fast up to speed on write. When continued, it gives record size error of 1 vs. 200.
	002	001	
	003	002	
	004	003	
c.	IS	SHOULD BE	
	002	001	This pattern indicates shifted bits in the data while it is still in serial form. The fault is probably in the timing.
	004	002	
	006	003	
	010	004	
	012	005	
	014	006	

SECTION V

SWITCH REGISTER DIAGNOSTIC

INTRODUCTION

The Switch Register Diagnostic may be used to control 85001A functions manually from the computer's switch register. This diagnostic is a valuable servicing tool. It allows the technician to monitor test points throughout the 85001A with an oscilloscope and observe the effect of changing functions. Refer to the Service Diagram (Figure 6-3) for the test points, and to Appendix A for the descriptions of each test point in the 85001A.

OPERATING PROCEDURE FOR HP 2100 COMPUTER

Use the following procedure to load the Switch Register Diagnostic into core:

1. Load instructions contained in Table 5-1 into computer's core memory.

Table 5-1. Switch Register Control Program (2100)

Input these instructions into memory:	At these addresses:	Machine Instruction
102501	200	LIA 01
102610	201	OTA 10
106510	202	LIB 10
106601	203	OTB 01
103710	204	STC, C 10
102310	205	SFS 10
024205	206	JMP*-1
024201	207	JMP*-6

Note: The set of instructions above assumes the 85001A is in I/O channel 10. If using any other I/O channel, the instructions must be modified in addresses 201, 202, 204, and 205.

2. Set the P-register to 200₈.
3. Enter command from Table 5-3 into computer's switch register.
4. Press PRESET, then press RUN. The status bits will replace the command in the Switch Register as soon as the command is accepted by the 85001A.

CAUTION

When issuing a command, the cassette will try to pull tape until the computer is HALTED. Failure to HALT the computer when the cassette is at EOT (end-of-tape) will result in permanent damage to the pinch roller. It is therefore important to HALT the computer before EOT. EOT is indicated by bit 12 in the computer's switch register (LEADER/OXIDE).

CAUTION

When at BOT (beginning-of-tape) due to a rewind command, the tachometer will time out and the rewind idler will periodically try to rewind the tape. This will be noted by the rewind solenoid opening and closing, causing the head arm assembly to chatter back and forth as the head goes in and out. Immediately HALT the computer.

OPERATING PROCEDURE FOR HP 2114/2115/2116 COMPUTER

1. Load instructions contained in Table 5-2 into computer's core memory.

*Table 5-2. Switch Register Control Program
(2114, 2115, and 2116)*

Input these instructions into memory:	At these addresses:	Machine Instruction
102501	200	LIA 01
102610	201	OTA 10
106510	202	LIB 10
103710	203	STC, C 10
102310	204	SFS 10
024204	205	JMP*-1
024200	206	JMP*-6

Note: The set of instructions above assumes the 85001A is in I/O channel 10. If using any other I/O channel, the instructions must be modified in addresses 201 through 204.

2. After loading instructions in Table 5-2, load address 200₈.
3. Enter command from Table 5-3 into computer's switch register.
4. Press PRESET, then press RUN.

CAUTION

When issuing a command, the cassette will try to pull tape until the computer is HALTED. Failure to HALT the computer when the cassette is at EOT (end-of-tape) will result in permanent damage to the pinch roller. It is therefore important to HALT the computer before EOT. EOT is indicated by bit 12 in the computer's B-register (LEADER/OXIDE).

CAUTION

When at BOT (beginning of tape) due to a rewind command, the tachometer will time out and the rewind idler will periodically try to rewind the tape. This will be noted by the rewind solenoid opening and closing, causing the head arm assembly to chatter back and forth as the head goes in and out. Immediately HALT the computer.

Table 5-3. Switch Register Commands

Mode	Deck 1	Deck 2	Deck 3
WRITE. Enter 8-bit word in switches 0-7. Status bits 9 (FLAG) and 10 (WRITE) are set in the B-register.	002400	003000	003400
WRITE FILE MARK. Writes continuous file mark. Status bits 9 (FLAG) and 10 (WRITE) are set in the B-register.	042400	043000	043400
SEARCH. Selected deck is put into the SEARCH mode. Each file gap detected causes bit 13 to set. If computer is HALT'ed after giving the SEARCH command, the cassette will stop when it encounters the next file gap.	100400	101000	101400
REWIND. Rewinds cassette to BOT. When oxide is encountered, bit 12 will set.	020400	021000	021400
HALT. This command may be issued while tape is in motion. Bit 15 (ERROR STATUS) may be tested by halting in the middle of a character and then going to the READ mode.	010400	011000	011400
READ. Reads data in bits 0-7 of the B-register.	004400	005000	005400

NOTE

In the READ mode, it is helpful to have cassette SRTD1 at hand. This is a tape recorded with all "1"s and no record gaps or file gaps.

SRTD1 may be created by running the Switch Register Diagnostic in the WRITE mode, and selecting switches 0-7 on the computer's switch register. When the tape reaches EOT, bit 12 (LEADER/OXIDE) will set. IMMEDIATELY HALT the computer.

Table 5-4. 85001A Words

INPUT WORD (Input to computer from 85001A)

0	Data Read
1	Data Read
2	Data Read
3	Data Read
4	Data Read
5	Data Read
6	Data Read
7	Data Read
8	Deck Ready Bit
9	Flag Status Bit
10	Write Status Bit
11	Read Status Bit
12	Leader/Oxide Status Bit
13	File Mark Status Bit
14	Write Lock Out Status Bit
15	Error Status Bit

OUTPUT WORD (Output from computer to 85001A)

0	Data Write
1	Data Write
2	Data Write
3	Data Write
4	Data Write
5	Data Write
6	Data Write
7	Data Write
8	Deck Select Bit 0
9	Deck Select Bit 1
10	Write Command
11	Read Command
12	Halt Command
13	Rewind Command
14	File Mark Command
15	Search Command

SECTION VI

SERVICE DIAGRAM DESCRIPTION

GENERAL DESCRIPTION

The control word issued by the computer is buffered by the Computer Control Assembly (A6). The control word selects a deck and one function (for example, READ). It is ANDed with the command strobe to transfer control information to the rest of the 85001A.

Most of the control word is sent to the Motion Control Assembly (A5), which selects the READ or WRITE and DECK SELECT latches. The selected deck is put into motion by IMOT via one of the Deck Control Assemblies (A1, A2, or A3). If the photocell on the selected deck detects leader, BOT DELAY is enabled. This delay inhibits reading or writing until the tape is a few inches past the leader/oxide splice.

When IMOT is issued, UP TO SPEED DELAY is also enabled. This assures that the selected deck is up to speed before attempting to read or write.

The Deck Control Assemblies (A1, A2, A3) control the transports. This includes head position, rewind or forward motion, and brake. The Deck Control Assemblies also buffer the signal from the photocell and position switches on the transport. The position switches monitor the current physical state of the transport (head in or head out).

ON LINE WRITE MODE

Assume a WRITE control word has been issued by the computer. When the status lines indicate the 85001A is in the WRITE mode and a deck is selected (checked by software), the 8-bit data word is parallel strobed by NDATT* into REG 1 on the Shift Register Assembly (A9). Because REG 2 contains no information during the first data transfer, the contents of REG 1 is immediately parallel strobed into REG 2 by the DATA TRANSFER STROBE.

REG 2 serially transfers the 8-data bits into the WRITE FLIP-FLOP on the Tape Data Control Assembly (A13). From there it is transferred to the WRITE AMPLIFIER on the Read/Write Electronics Assembly (A15). The data is clocked out of REG 2 by the 5 kHz** TAPE CLOCK on A13. This clock complements the WRITE FLIP-FLOP at the beginning of the first eight cell times. This is explained in the discussion of the DIPHAASE RECORDING TECHNIQUE in the Maintenance Manual. The cell times are counted by CNTR 2 on the TTY Control Assembly (A12). When CNTR 2=8, the SEND DATA FLIP-FLOP sets, and REG 2 resets. This indicates that the 8 bit word has been transferred out of REG 2 and written on tape.

The TAKE DATA FLIP-FLOP is set by the WRITE COMMAND strobe (NDATT). The SEND DATA and TAKE DATA signals are ANDed to produce the DATA TRANSFER STROBE to empty the contents of REG 1 into REG 2.

This also sets the FLAG indicating REG 1 is ready for another word from the computer. CNTR 2 is reset at CNTR 2=11. A 3 bit cell time character gap is written on tape during the interval CNTR 2=8 to CNTR 2= 11. The cycle is now repeated with a new 8 bit word being strobed into REG 1.

*Signals NDATT, ODATT, and CMDT are generated by a computer STC.

**This is a 10 kHz clock; however, only every other cycle is used to clock the WRITE sequence.

ON LINE READ MODE

Assume a READ control word has been issued by the computer, and that the status lines indicate the 85001A is in the READ mode and a deck is selected.

As in the WRITE mode, signals IMOT, UP TO SPEED DELAY, and BOT DELAY are generated. The DECK SELECT signals are sent to the Read/Write Electronics Assembly (A15). There, one of the read preamplifiers is selected. Flux reversals on the tape generate an analog signal, which is sent to the Reproduce Amplifier Assembly (A14). Toggling of the BI-POLAR FLIP-FLOP generates a DATA READ CLOCK. The DATA READ CLOCK starts and clocks the read sequence.

The DATA READ CLOCK generates a 135 usec delay called READ TAPE SHIFT. When this delay times out, REG 1 SHIFT is generated. This shifts data (0 or 1) from the BI-POLAR FLIP-FLOP into REG 1, causing all prior bits to shift up one place. REG 1 SHIFT also increments CNTR 1.

READ TAPE SHIFT is timed by two delays—GAP T1 (450 usec) and GAP T2 (1.1 msec). Each READ TAPE SHIFT starts these timers. If GAP T1 times out (indicating that READ TAPE SHIFT has been absent for 450 usec), then a character gap has been encountered. If this occurs, CNTR 1 is checked to verify eight bits have been assembled. If CNTR 1 does not equal 8, then ERROR FLAG is generated. ERROR FLAG is also generated if an odd number of flux reversals are detected. READ TAPE TAKE DATA SET, which is generated by GAP T1, sets the TAKE DATA FLIP-FLOP. TAKE DATA is ANDed with SEND DATA to produce the DATA TRANSFER STROBE. This strobe parallel transfers the contents of REG 1 into REG 2. It also causes REG 1 to reset, SEND DATA to reset, the FLAGS latch to set, and the TAKE DATA FLIP-FLOP to reset.

The computer senses if REG 2 is ready to transmit a character by examining the flag status line (FLAGS). When it detects FLAGS, the computer generates ODATT. This resets the FLAGS latch and CNTR 2. The next character is then shifted into REG 1 to repeat the cycle.

SEARCH MODE

In the SEARCH mode, the SEARCH latch on the Computer Control Assembly (A6) is set. When this latch is set, the GAP T2 times out (indicating that a gap longer than a character gap has been detected), the FILE GAP DETECT latch will time for 50 ms. At the end of this time, FLMKS will be presented to the computer, indicating that a FILE MARK has been detected. The 85001A halts in the first record gap following the file gap.

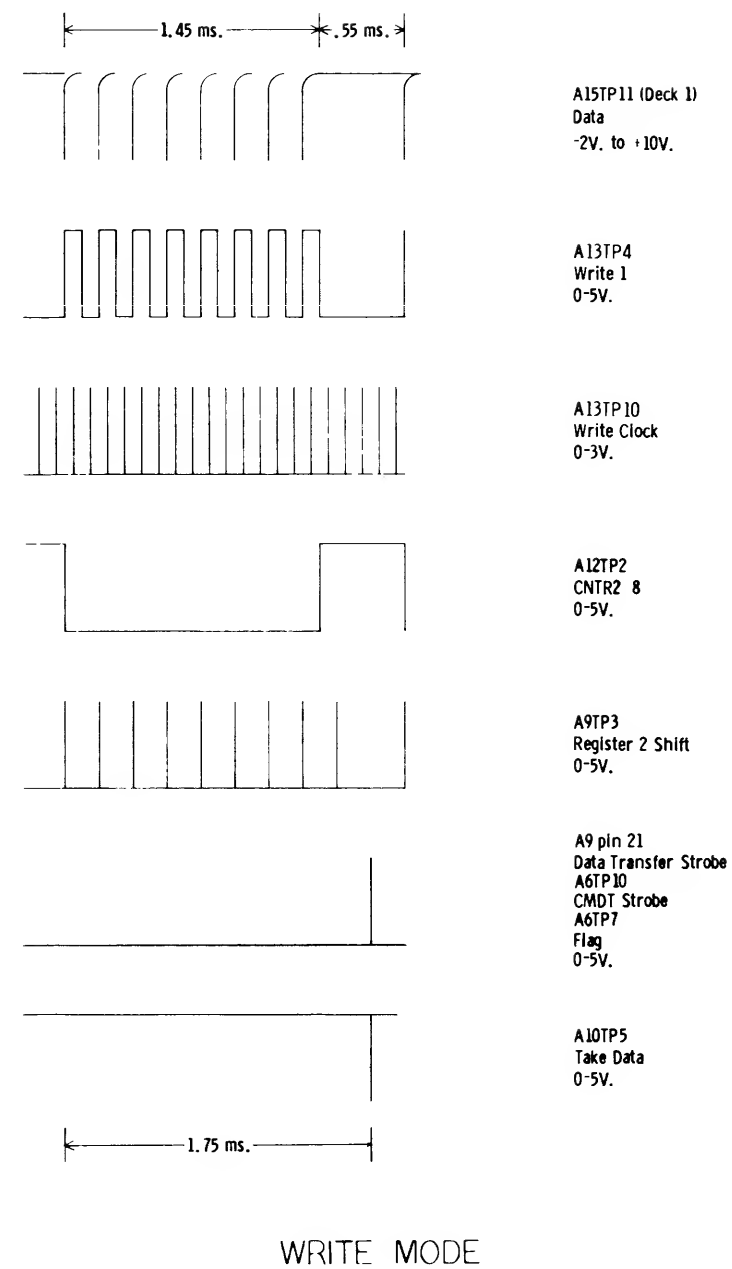


Figure 6-1. Write Mode Waveforms

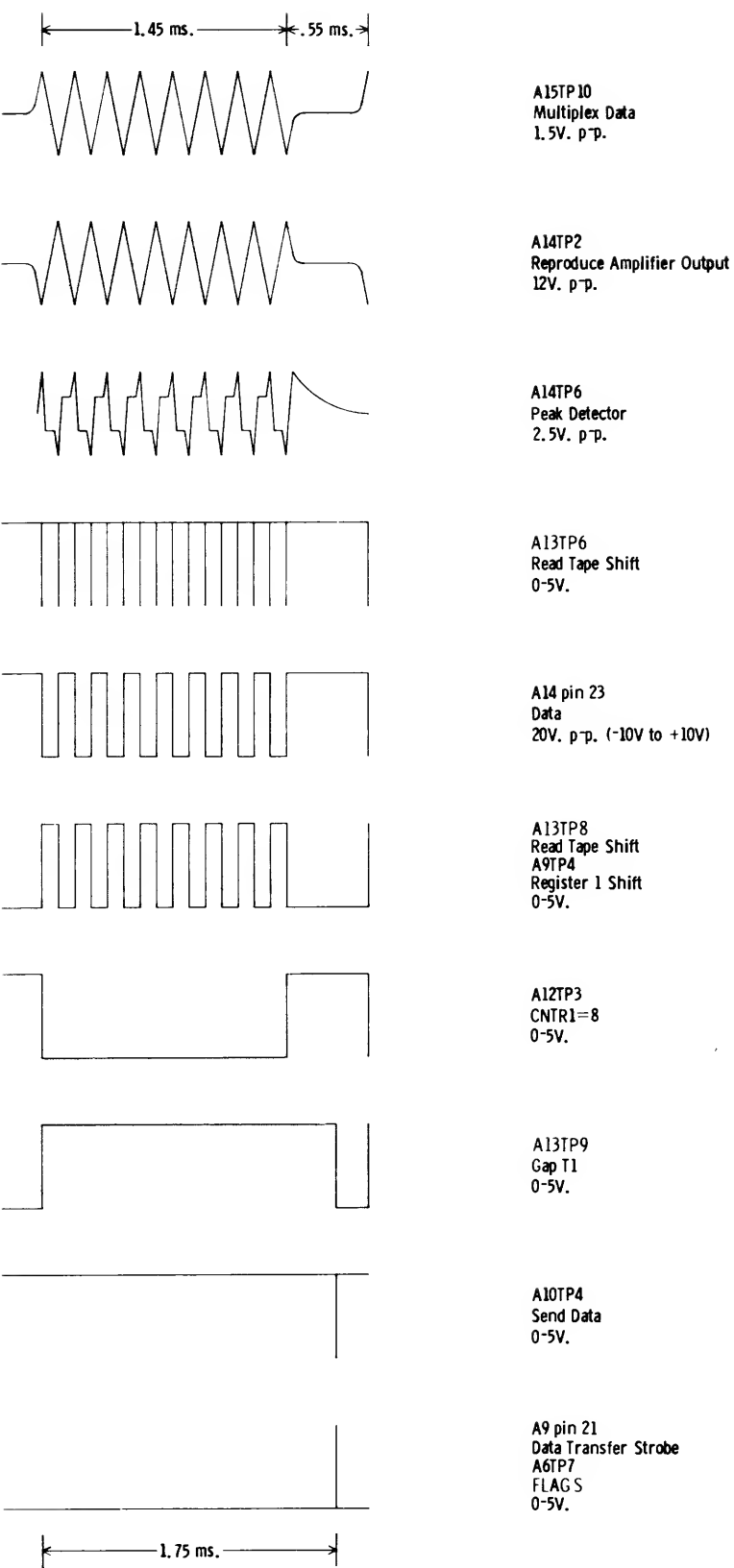
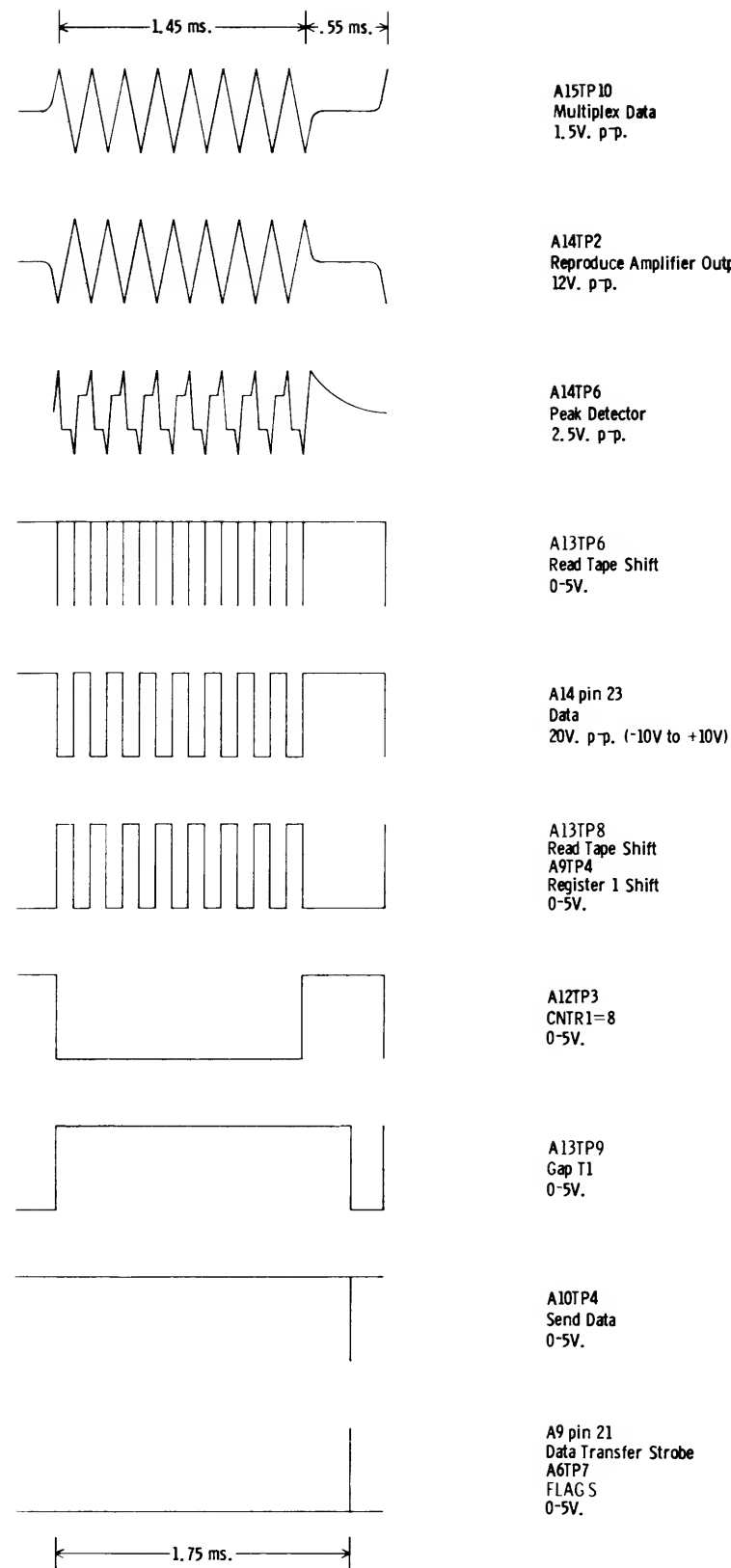


Figure 6-2. Read Mode Waveforms



READ MODE

Figure 6-2. Read Mode Waveforms

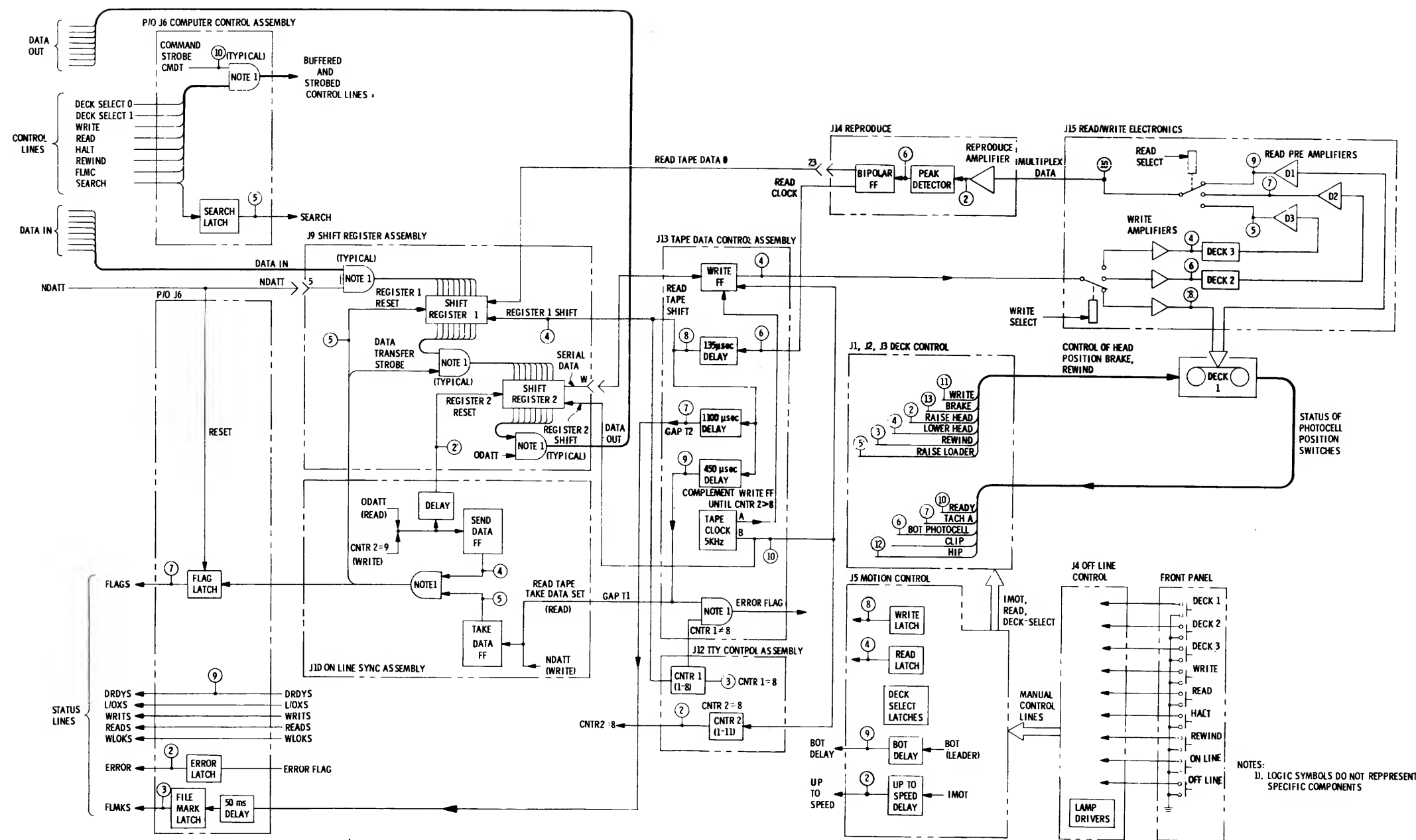


Figure 6-3. Service Diagram

Figure 6-3. Service Diagram

SECTION VII

REPLACEABLE PARTS

INTRODUCTION

This section contains information for ordering replaceable parts. Table 7-2 is the list of replaceable parts. Table 7-3 contains the names and addresses that correspond to the manufacturer's code numbers.

NOTE

In an effort to make this parts list easy to use for people already familiar with Hewlett-Packard's nomenclature and parts list format, all integrated circuits from DICOM's schematic diagrams are changed from "A" to the more conventional "U".

TABLE OF REPLACEABLE PARTS

The table of replaceable parts is organized as follows:

- a. Electrical assemblies and their component parts in alpha-numeric order by reference designation.
- b. Chassis parts in alpha-numeric order by reference designation.
- c. Miscellaneous parts.

The information given for each part is as follows:

- a. The Hewlett-Packard part number.
- b. Total Quantity (TQ) in the instrument. Total quantity is given only once—at the first appearance of the part number.
- c. Description of the part.
- d. Typical manufacturer of the part, in a five-digit code.
- e. The manufacturer's number for the part.

ORDERING INFORMATION

To order a part listed in the replaceable parts table, quote the Hewlett-Packard part number, indicate the quantity required, and address the order to the nearest Hewlett-Packard office.

To order a part that is not listed in the replaceable parts table, include the instrument model number, instrument serial number, the description and function of the part, and number of parts required. Address the order to the nearest Hewlett-Packard office.

Table 7-1. Exchange Board Numbers

Assembly Number	Description	HP Part No. New	HP Part No. Exchange
A1, A2, A3	Deck Control Assembly	1150-0394	1150-0407
A4	Off-Line Control/Lamp Driver Assembly	1150-0395	1150-0408
A5	Motion Control Assembly	1150-0396	1150-0409
A6	Computer Control Assembly	1150-0397	1150-0410
A9	Shift Register #1 and #2 Assembly	1150-0398	1150-0411
A10	On-Line Sync Control Assembly	1150-0399	1150-0412
A11	Mode and State Decode Assembly	1150-0399	1150-0413
A12	TTY Control Assembly	1150-0401	1150-0414
A13	Tape Data Control Assembly	1150-0402	1150-0415
A14	Reproduce Electronics Assembly	1150-0403	1150-0416
A15	Read/Write Electronics Assembly	1150-0404	1150-0417
A22	Power Supply Regulator Assembly	1150-0405	1150-0418
—	Tape Transport Assembly	1150-0406	1150-0419

Table 7-2. Replaceable Parts

Reference Designation	HP Part Number	Qty	Description	Mfr Code	Mfr Part Number
A1	1150-0394	3	BOARD ASSY:DECK CONTROL	50436	1150-0394
A1	1150-0407	3	REBUILT 1150-0394,REQUIRES EXCHANGE	50436	1150-0407
A1C1	0160-0161	8	C:FXD MY 0.01 UF 10% 200VDCW	56289	192P10392-PTS
A1C2	0160-0161		C:FXD MY 0.01 UF 10% 200VDCW	56289	192P10392-PTS
A1C3	0180-0197	9	C:FXD ELECT 2.2 UF 10% 20VDCW	56289	1500225X9020A2-DYS
A1C4	0180-0197		C:FXD ELECT 2.2 UF 10% 20VDCW	56289	1500225X9020A2-DYS
A1C5	0180-0300	9	C:FXD AL ELECT 20 UF +75-10% 15VDCW	56289	30D206G015882-DSM
A1C6	0160-3060	35	C:FXD CER 0.1 UF 20% 25VOCW	56289	3C42A-CML
A1C7	0160-3060		C:FXD CER 0.1 UF 20% 25VDCW	56289	3C42A-CML
A1C8	0160-3060		C:FXD CER 0.1 UF 20% 25VOCW	56289	3C42A-CML
A1C9	0180-0059	16	C:FXD ELECT 10 UF +75-10% 25VOCW	28480	0180-0059
A1CR1	1901-0040	69	O1ODE:SILICON 30MA 30WV	07263	FDG1088
A1CR2	1901-0040		O1ODE:SILICON 30MA 30WV	07263	FDG1088
A1CR3	1901-0040		O1ODE:SILICON 30MA 30WV	07263	FDG1088
A1CR4	1901-0040		O1ODE:SILICON 30MA 30WV	07263	FDG1088
A1CR5	1901-0040		O1ODE:SILICON 30MA 30WV	07263	FDG1088
A1CR6	1901-0040		O1ODE:SILICON 30MA 30WV	07263	FDG1088
A1CR7	1901-0040		O1ODE:SILICON 30MA 30WV	07263	FDG1088
A1CR8	1901-0040		O1ODE:SILICON 30MA 30WV	07263	FDG1088
A1CR9	1901-0040		O1ODE:SILICON 30MA 30WV	07263	FDG1088
A1CR10	1901-0040		O1ODE:SILICON 30MA 30WV	07263	FDG1088
A1Q1	1854-0347	15	TSTR:SI NPN	80131	2N4923
A1Q2	1854-0347		TSTR:SI NPN	80131	2N4923
A1Q3	1854-0347		TSTR:SI NPN	80131	2N4923
A1Q4	1854-0347		TSTR:SI NPN	80131	2N4923
A1Q5	1853-0036	16	TSTR:SI PNP	80131	2N3906
A1Q6	1854-0347		TSTR:SI NPN	80131	2N4923
A1Q7	1535-1310	6	TRANSISTOR	50436	D13T1
A1R1	0683-2225	53	R:FXD COMP 2.2K OHM 5% 1/4W	01121	CB 2225
A1R2	0683-2225		R:FXD COMP 2.2K OHM 5% 1/4W	01121	CB 2225
A1R3	0683-2225		R:FXD COMP 2.2K OHM 5% 1/4W	01121	CB 2225
A1R4	0686-6805	6	R:FXD COMP 68 OHM 5% 1/2W	01121	EB 6805
A1R5	0683-1635	14	R:FXD COMP 16K OHM 5% 1/4W	01121	CB 1635
A1R6	0683-5115	16	R:FXD COMP 510 OHM 5% 1/4W	01121	CB 5115
A1R7	0683-0275	15	R:FXD COMP 2.7 OHM 5% 1/4W	01121	CB 2765
A1R8	0683-2225		R:FXD COMP 2.2K OHM 5% 1/4W	01121	CB 2225
A1R9	0683-2225		R:FXD COMP 2.2K OHM 5% 1/4W	01121	CB 2225
A1R10	0686-1515	9	R:FXD COMP 150 OHM 5% 1/2W	01121	EB 1515
A1R11	0683-1635		R:FXD COMP 16K OHM 5% 1/4W	01121	CB 1635
A1R12	0683-5115		R:FXD COMP 510 OHM 5% 1/4W	01121	CB 5115
A1R13	0683-0275		R:FXD COMP 2.7 OHM 5% 1/4W	01121	CB 2765
A1R14	0686-2215	3	R:FXD COMP 220 OHM 5% 1/2W	01121	EB 2215
A1R15	0683-1635		R:FXD COMP 16K OHM 5% 1/4W	01121	CB 1635
A1R16	0683-5115		R:FXD COMP 510 OHM 5% 1/4W	01121	CB 5115
A1R17	0683-0275		R:FXD COMP 2.7 OHM 5% 1/4W	01121	CB 2765
A1R18	0686-6805		R:FXD COMP 68 OHM 5% 1/2W	01121	EB 6805
A1R19	0683-1635		R:FXD COMP 16K OHM 5% 1/4W	01121	CB 1635
A1R20	0683-5115		R:FXD COMP 510 OHM 5% 1/4W	01121	CB 5115
A1R21	0698-3547	5	R:FXD COMP 1 OHM 5% 1/2W	01121	EB 1065
A1R22	0683-2225		R:FXD COMP 2.2K OHM 5% 1/4W	01121	CB 2225
A1R23	0683-1525	7	R:FXD COMP 1500 OHM 5% 1/4W	01121	CB 1525
A1R24	0683-1045	9	R:FXD COMP 100K OHMS 5% 1/4W	01121	CB 1045
A1R25	0683-1825	10	R:FXD COMP 1800 OHM 5% 1/4W	01121	CB 1825
A1R26	0683-2225		R:FXD COMP 2.2K OHM 5% 1/4W	01121	CB 2225
A1R27	0683-1015	9	R:FXD COMP 100 OHM 5% 1/4W	01121	CB 1015
A1R28	0683-1015		R:FXD COMP 100 OHM 5% 1/4W	01121	CB 1015
A1R29	0683-4735	4	R:FXD COMP 47K OHM 5% 1/4W	01121	CB 4735
A1R30	0683-1045		R:FXD COMP 100K OHMS 5% 1/4W	01121	CB 1045
A1R31	0683-5125	36	R:FXD COMP 5100 OHM 5% 1/4W	01121	CB 5125
A1R32	0683-6805	3	R:FXD COMP 68 OHM 5% 1/4W	01121	CB 6805
A1R33	0683-4725	5	R:FXD COMP 4700 OHM 5% 1/4W	01121	CB 4725
A1R34	0686-1515		R:FXD COMP 150 OHM 5% 1/2W	01121	EB 1515
A1R35	0683-1635		R:FXD COMP 16K OHM 5% 1/4W	01121	CB 1635
A1R36	0683-5115		R:FXD COMP 510 OHM 5% 1/4W	01121	CB 5115
A1R37	0683-0275		R:FXD COMP 2.7 OHM 5% 1/4W	01121	CB 2765
A1R38	0683-1035	19	R:FXD COMP 10K OHM 5% 1/4W	01121	CB 1035
A1R39	0683-2225		R:FXD COMP 2.2K OHM 5% 1/4W	01121	CB 2225
A1R40	0683-1225	16	R:FXD COMP 1200 OHM 5% 1/4W	01121	CB 1225
A1U1	1820-0307	55	IC:DIGITAL DTL HEX INVERTER	04713	MC836P
A1U2	1820-0310	16	IC:DTL TRIPLE 3-INPUT NANO GATE	04713	SC6910PK
A1U3	1820-0256	17	IC:DTL QUAD 2-INPUT POWER GATE	04713	MC858P
A1U4	1820-0256		IC:DTL QUAD 2-INPUT POWER GATE	04713	MC858P
A1U5	1820-0094	76	IC:DTL QUAD 2-INPUT GATE	04713	SC6903PK
A1U6	1820-0307		IC:DIGITAL DTL HEX INVERTER	04713	MC836P
A1U7	1820-0094		IC:DTL QUAD 2-INPUT GATE	04713	SC6903PK

See introduction to this section for ordering information

Table 7-2. Replaceable Parts

Reference Designation	HP Part Number	Qty	Description	Mfr Code	Mfr Part Number
A1U8	1820-0307		IC:DIGITAL OTL HEX INVERTER		
A1U9	1820-0094		IC:OTL QUAD 2-INPUT GATE	04713	SC6903PK
A1U10	1820-0094		IC:OTL QUAD 2-INPUT GATE	04713	SC6903PK
A1U11	1820-0094		IC:OTL QUAD 2-INPUT GATE	04713	SC6903PK
A1U12	1820-0094		IC:OTL QUAD 2-INPUT GATE	04713	SC6903PK
A1U13	1820-0094		IC:OTL QUAD 2-INPUT GATE	04713	SC6903PK
A1U14	1820-0094		IC:OTL QUAD 2-INPUT GATE	04713	SC6903PK
A1U15	1820-0094		IC:OTL QUAD 2-INPUT GATE	04713	SC6903PK
A2			SAME AS A1, USE PREFIX A2		
A3			SAME AS A1, USE PREFIX A3		
A4	1150-0395	1	BOARD ASSY:OFF-LINE CONTROL/LAMP DRIVER	50436	1150-0395
A4	1150-0408	1	REBUILT 1150-0395,REQUIRES EXCHANGE	50436	1150-0408
A4C1	0160-0153	18	C:FXD MY 0.001 UF 10% 200VDCW	56289	192P10292-PTS
A4C2	0160-0153		C:FXD MY 0.001 UF 10% 200VDCW	56289	192P10292-PTS
A4C3	0160-0153		C:FXD MY 0.001 UF 10% 200VDCW	56289	192P10292-PTS
A4C4	0160-0161		C:FXD MY 0.01 UF 10% 200VDCW	56289	192P10392-PTS
A4C5	0180-0059		C:FXD ELECT 1Q UF +75-10% 25VDCW	28480	0180-0059
A4C6	0180-0059		C:FXD ELECT 1Q UF +75-10% 25VDCW	28480	0180-0059
A4C7	0160-3060		C:FXD CER 0.1 UF 20% 25VDCW	56289	3C42A-CML
A4C8	0160-3060		C:FXD CER 0.1 UF 20% 25VDCW	56289	3C42A-CML
A4C9	0180-0338	1	C:FXD ELECT 25UF +75-10% 25VDCW	28480	0180-0338
A4C10	0180-0059		C:FXD ELECT 1Q UF +75-10% 25VDCW	28480	0180-0059
A4C11	0160-0153	1	C:FXD MY 0.001 UF 10% 200VDCW	56289	192P10292-PTS
A4C12	0180-0300		C:FXD AL ELECT 20 UF +75-10% 15VDCW	56289	300206G015882-DSM
A4C13	0180-0300		C:FXD AL ELECT 20 UF +75-10% 15VDCW	56289	300206G015882-DSM
A4C14	0160-0153		C:FXD MY 0.001 UF 10% 200VDCW	56289	192P10292-PTS
A4C15	0160-0153		C:FXD MY 0.001 UF 10% 200VDCW	56289	192P10292-PTS
A4C16	0180-0197		C:FXD ELECT 2.2 UF 10% 20VDCW	56289	1500225X9020A2-DYS
A4CR1	1901-0040		DIODE:SILICON 30MA 30WV	07263	FDG1088
A4CR2	1901-0040		DIODE:SILICON 30MA 30WV	07263	FDG1088
A4CR3	1901-0040		DIODE:SILICON 30MA 30WV	07263	FDG1088
A4Q1	1853-0036	4	TSTR:SI PNP	80131	2N3906
A4Q2	1854-0215		TSTR:SI NPN	80131	2N3904
A4Q3	1535-1310		TRANSISTOR	50436	D13T1
A4R1	0683-1225		R:FXD COMP 1200 OHM 5% 1/4W	01121	C8 1225
A4R2	0683-1225		R:FXD COMP 1200 OHM 5% 1/4W	01121	C8 1225
A4R3	0683-1225		R:FXD COMP 1200 OHM 5% 1/4W	01121	C8 1225
A4R4	0683-1225		R:FXD COMP 1200 OHM 5% 1/4W	01121	C8 1225
A4R5	0683-1225		R:FXD COMP 1200 OHM 5% 1/4W	01121	C8 1225
A4R6	0683-1225		R:FXD COMP 1200 OHM 5% 1/4W	01121	C8 1225
A4R7	0683-1225		R:FXD COMP 1200 OHM 5% 1/4W	01121	C8 1225
A4R8	0683-1225		R:FXD COMP 1200 OHM 5% 1/4W	01121	C8 1225
A4R9	0683-1225		R:FXD COMP 1200 OHM 5% 1/4W	01121	C8 1225
A4R10	0683-2225		R:FXD COMP 2.2K OHM 5% 1/4W	01121	C8 2225
A4R11	0683-2225		R:FXD COMP 2.2K OHM 5% 1/4W	01121	C8 2225
A4R12	0683-2225		R:FXD COMP 2.2K OHM 5% 1/4W	01121	C8 2225
A4R13	0683-2225		R:FXD COMP 2.2K OHM 5% 1/4W	01121	C8 2225
A4R14	0683-2225		R:FXD COMP 2.2K OHM 5% 1/4W	01121	C8 2225
A4R15	0683-2225		R:FXD COMP 2.2K OHM 5% 1/4W	01121	C8 2225
A4R16	0683-2225		R:FXD COMP 2.2K OHM 5% 1/4W	01121	C8 2225
A4R17	0683-2225		R:FXD COMP 2.2K OHM 5% 1/4W	01121	C8 2225
A4R18	0683-2225		R:FXD COMP 2.2K OHM 5% 1/4W	01121	C8 2225
A4R19	0683-2225		R:FXD COMP 2.2K OHM 5% 1/4W	01121	C8 2225
A4R20	0683-2225		R:FXD COMP 2.2K OHM 5% 1/4W	01121	C8 2225
A4R21	0683-3925	8	R:FXD COMP 3900 OHM 5% 1/4W	01121	C8 3925
A4R22	0683-1025	13	R:FXD COMP 10Q OHM 5% 1/4W	01121	C8 1025
A4R23	0683-2725	3	R:FXD COMP 27Q OHM 5% 1/4W	01121	C8 2725
A4R24	0686-1215	1	R:FXD COMP 120 OHM 5% 1/2W	01121	E8 1215
A4R25	0683-1025		R:FXD COMP 1000 OHM 5% 1/4W	01121	C8 1025
A4R26	0683-2735	2	R:FXD COMP 27K OHM 5% 1/4W	01121	C8 2735
A4R27	0683-1025		R:FXD COMP 1000 OHM 5% 1/4W	01121	C8 1025
A4R28	0683-1035		R:FXD COMP 10K OHM 5% 1/4W	01121	C8 1035
A4R29	0683-1825		R:FXD COMP 1800 OHM 5% 1/4W	01121	C8 1825
A4R30	0683-1035		R:FXD COMP 10K OHM 5% 1/4W	01121	C8 1035
A4R31			NOT ASSIGNED		
A4R32			NOT ASSIGNED		
A4R33	0683-3335	2	R:FXD COMP 33K OHM 5% 1/4W	01121	C8 3335
A4R34	0683-1825		R:FXD COMP 1800 OHM 5% 1/4W	01121	C8 1825
A4R35			NOT ASSIGNED		
A4R36	0683-2225		R:FXD COMP 2.2K OHM 5% 1/4W	01121	C8 2225
A4U1	1820-0207	8	IC:TTL MONOSTABLE MULTIVIBRATOR	28480	1820-0207
A4U2	1820-0307		IC:DIGITAL OTL HEX INVERTER	04713	MC836P
A4U3	1820-0307		IC:DIGITAL OTL HEX INVERTER	04713	MC836P
A4U4	1820-0310		IC:OTL TRIPLE 3-INPUT NAND GATE	04713	SC6910PK
A4U5	1820-0094		IC:OTL QUAD 2-INPUT GATE	04713	SC6903PK

See introduction to this section for ordering information

Table 7-2. Replaceable Parts

Reference Designation	HP Part Number	Qty	Description	Mfr Code	Mfr Part Number
A4U6	1820-0307		IC:DIGITAL DTL HEX INVERTER	04713	MC836P
A4U7	1820-0307		IC:DIGITAL DTL HEX INVERTER	04713	MC836P
A4U8	1820-0094		IC:DTL QUAD 2-INPUT GATE	04713	SC6903PK
A4U9	1820-0094		IC:DTL QUAD 2-INPUT GATE	04713	SC6903PK
A4U10	1820-0094		IC:DTL QUAD 2-INPUT GATE	04713	SC6903PK
A4U11	1820-0256		IC:DTL QUAD 2-INPUT POWER GATE	04713	MC858P
A4U12	1820-0256		IC:DTL QUAD 2-INPUT POWER GATE	04713	MC858P
A4U13	1820-0256		IC:DTL QUAD 2-INPUT POWER GATE	04713	MC858P
A4U14	1820-0307		IC:DIGITAL DTL HEX INVERTER	04713	MC836P
A4U15	1820-0307		IC:DIGITAL DTL HEX INVERTER	04713	MC836P
A5	1150-0396	1	BOARD ASSY:MOTION CONTROL	50436	1150-0396
A5	1150-0409	1	REBUILT 1150-0396,REQUIRES EXCHANGE	50436	1150-0409
A5C1	0160-2205	4	C:FxD MICA 120 PF 5%	28480	0160-2205
A5C2			NOT ASSIGNED		
A5C3			NOT ASSIGNED		
A5C4			NOT ASSIGNED		
A5C5			NOT ASSIGNED		
A5C6			NOT ASSIGNED		
A5C7			NOT ASSIGNED		
A5C8	0160-0153		C:FxD MY 0.001 UF 10% 200VDCW	56289	192P10292-PTS
A5C9	0160-0153		C:FxD MY 0.001 UF 10% 200VDCW	56289	192P10292-PTS
A5C10	0180-2141	1	C:FxD ELECT 3.3 UF 10% 50VDCW	56289	1500335X905082-DYS
A5C11	0160-0154	6	C:FxD MICA MY 0.0022 UF 10% 200VDCW	56289	192P22292-PTS
A5C12	0160-3060		C:FxD CER 0.1 UF 20% 25VDCW	56289	3C42A-CML
A5C13	0160-0889	2	C:FxD MY 0.33 UF 10% 80VDCW	28480	0160-0889
A5C14			NOT ASSIGNED		
A5C15	0160-3060		C:FxD CER 0.1 UF 20% 25VDCW	56289	3C42A-CML
A5C16			NOT ASSIGNED		
A5C17	0160-3060		C:FxD CER 0.1 UF 20% 25VDCW	56289	3C42A-CML
A5C18			NOT ASSIGNED		
A5C19	0180-0059		C:FxD ELECT 10 UF +75-10% 25VDCW	28480	0180-0059
A5C20	0180-0059		C:FxD ELECT 10 UF +75-10% 25VDCW	28480	0180-0059
A5CR1	1901-0040		DIODE:SILICON 30MA 30MV	07263	FDG1088
A5CR2			NOT ASSIGNED		
A5CR3	1901-0040		DIODE:SILICON 30MA 30MV	07263	FDG1088
A5CR4	1901-0040		DIODE:SILICON 30MA 30MV	07263	FDG1088
A5CR5	1901-0040		DIODE:SILICON 30MA 30MV	07263	FDG1088
A5CR6	1901-0040		DIODE:SILICON 30MA 30MV	07263	FDG1088
A5Q1	1535-1310		TRANSISTOR	50436	013T1
A5Q2	1535-1310		TRANSISTOR	50436	013T1
A5R1			NOT ASSIGNED		
A5R2			NOT ASSIGNED		
A5R3	0683-2225		R:FxD COMP 2.2K OHM 5% 1/4W	01121	CB 2225
A5R4	0683-1825		R:FxD COMP 1800 OHM 5% 1/4W	01121	CB 1825
A5R5	0683-1025		R:FxD COMP 1000 OHM 5% 1/4W	01121	CB 1025
A5R6	0683-6835	1	R:FxD COMP 68K OHM 5% 1/4W	01121	CB 6835
A5R7	0683-8235	1	R:FxD COMP 82K OHM 5% 1/4W	01121	CB 8235
A5R8	0683-1825		R:FxD COMP 1800 OHM 5% 1/4W	01121	CB 1825
A5R9	0683-2225		R:FxD COMP 2.2K OHM 5% 1/4W	01121	CB 2225
A5R10	0683-5125		R:FxD COMP 5100 OHM 5% 1/4W	01121	CB 5125
A5U1	1820-0086	8	IC:DTL DUAL 4-INPUT GATE (EXPANDABLE)	04713	SC6900PK
A5U2	1820-0094		IC:DTL QUAD 2-INPUT GATE	04713	SC6903PK
A5U3	1820-0086		IC:DTL DUAL 4-INPUT GATE (EXPANDABLE)	04713	SC6900PK
A5U4	1820-0310		IC:DTL TRIPLE 3-INPUT NAND GATE	04713	SC6910PK
A5U5	1820-0094		IC:DTL QUAD 2-INPUT GATE	04713	SC6903PK
A5U6	1820-0094		IC:DTL QUAD 2-INPUT GATE	04713	SC6903PK
A5U7	1820-0310		IC:DTL TRIPLE 3-INPUT NAND GATE	04713	SC6910PK
A5U8	1820-0086		IC:DTL DUAL 4-INPUT GATE (EXPANDABLE)	04713	SC6900PK
A5U9	1820-0310		IC:DTL TRIPLE 3-INPUT NAND GATE	04713	SC6910PK
A5U10	1820-0094		IC:DTL QUAD 2-INPUT GATE	04713	SC6903PK
A5U11	1820-0310		IC:DTL TRIPLE 3-INPUT NAND GATE	04713	SC6910PK
A5U12	1820-0094		IC:DTL QUAD 2-INPUT GATE	04713	SC6903PK
A5U13	1820-0094		IC:DTL QUAD 2-INPUT GATE	04713	SC6903PK
A5U14	1820-0094		IC:DTL QUAD 2-INPUT GATE	04713	SC6903PK
A5U15	1820-0307		IC:DIGITAL DTL HEX INVERTER	04713	MC836P
A5U16	1820-0307		IC:DIGITAL DTL HEX INVERTER	04713	MC836P
A5U17	1820-0094		IC:DTL QUAD 2-INPUT GATE	04713	SC6903PK
A5U18	1820-0307		IC:DIGITAL DTL HEX INVERTER	04713	MC836P
A5U19	1820-0307		IC:DIGITAL DTL HEX INVERTER	04713	MC836P
A5U20	1820-0307		IC:DIGITAL DTL HEX INVERTER	04713	MC836P
A5U21	1820-0307		IC:DIGITAL DTL HEX INVERTER	04713	MC836P
A6	1150-0397	1	BOARD ASSY:COMPUTER CONTROL	50436	1150-0397
A6C1	1150-0410		REBUILT 1150-0397,REQUIRES EXCHANGE	50436	1150-0410
			NOT ASSIGNED		

See introduction to this section for ordering information

Table 7-2. Replaceable Parts

Reference Designation	HP Part Number	Qty	Description	Mfr Code	Mfr Part Number
A6C2	0160-2210	4	C:FXD MICA 470 PF 5%	28480	0160-2210
A6C3	0180-0339	4	C:FXD AL ELECT 50 UF +75-10% 15VDCW	56289	30D506G015CB2-DSM
A6C4	0160-2210		C:FXD MICA 470 PF 5%	28480	0160-2210
A6C5	0180-0059		C:FXD ELECT 10 UF +75-10% 25VDCW	28480	0180-0059
A6C6	0160-3060		C:FXD CER 0.1 UF 20% 25VDCW	56289	3C42A-CML
A6C7	0160-3060		C:FXD CER 0.1 UF 20% 25VDCW	56289	3C42A-CML
A6C8	0160-3060		C:FXD CER 0.1 UF 20% 25VDCW	56289	3C42A-CML
A6C9			NOT ASSIGNED		
A6C10	0160-2205		C:FXD MICA 120 PF 5%	28480	0160-2205
A6C11	0180-0228	1	C:FXD ELECT 22 UF 10% 15VDCW	56289	150D226X9015B2-OYS
A6C12			NOT ASSIGNED		
A6C13	0160-2205		C:FXD MICA 120 PF 5%	28480	0160-2205
A6C14	0160-2038	1			
A6CR1	1901-0040		DIODE:SILICON 30MA 30MV	07263	FDG1088
A6R1	0683-5125		R:FXD COMP 5100 OHM 5% 1/4W	01121	CB 5125
A6R2	0683-3325	1	R:FXD COMP 3300 OHM 5% 1/4W	01121	CB 3325
A6R3	0683-5125		R:FXD COMP 5100 OHM 5% 1/4W	01121	CB 5125
A6R4	0683-5125		R:FXD COMP 5100 OHM 5% 1/4W	01121	CB 5125
A6R5	0683-5125		R:FXD COMP 5100 OHM 5% 1/4W	01121	CB 5125
A6R6	0683-5125		R:FXD COMP 5100 OHM 5% 1/4W	01121	CB 5125
A6R7	0683-5125		R:FXD COMP 5100 OHM 5% 1/4W	01121	CB 5125
A6R8	0683-5125		R:FXD COMP 5100 OHM 5% 1/4W	01121	CB 5125
A6R9	0683-5125		R:FXD COMP 5100 OHM 5% 1/4W	01121	CB 5125
A6R10	0683-5125		R:FXD COMP 5100 OHM 5% 1/4W	01121	CB 5125
A6R11	0683-5125		R:FXD COMP 5100 OHM 5% 1/4W	01121	CB 5125
A6R12	0683-5125	1	R:FXD COMP 5100 OHM 5% 1/4W	01121	CB 5125
A6R13	0683-2705		R:FXD COMP 27 OHM 5% 1/4W	01121	CB 2705
A6R14	0683-5125		R:FXD COMP 5100 OHM 5% 1/4W	01121	CB 5125
A6R15	0683-5125		R:FXD COMP 5100 OHM 5% 1/4W	01121	CB 5125
A6R16	0683-5125		R:FXD COMP 5100 OHM 5% 1/4W	01121	CB 5125
A6R17	0683-5125		R:FXD COMP 5100 OHM 5% 1/4W	01121	CB 5125
A6R18	0683-5125		R:FXD COMP 5100 OHM 5% 1/4W	01121	CB 5125
A6R19	0683-5125		R:FXD COMP 5100 OHM 5% 1/4W	01121	CB 5125
A6R20	0683-5125		R:FXD COMP 5100 OHM 5% 1/4W	01121	CB 5125
A6R21	0683-5125		R:FXD COMP 5100 OHM 5% 1/4W	01121	CB 5125
A6R22	0683-2025	1	R:FXD COMP 2000 OHM 5% 1/4W	01121	CB 2025
A6R23			NOT ASSIGNED		
A6R24	0683-0275		R:FXD COMP 2.7 OHM 5% 1/4W	01121	CB 27G5
A6R25	0683-1235	1	R:FXD COMP 12K OHM 5% 1/4W	01121	CB 1235
A6U1	1820-0094		IC:DTL QUAD 2-INPUT GATE	04713	SC6903PK
A6U2	1820-0307		IC:DIGITAL DTL HEX INVERTER	04713	MC836P
A6U3	1820-0307		IC:DIGITAL DTL HEX INVERTER	04713	MC836P
A6U4	1820-0094		IC:DTL QUAD 2-INPUT GATE	04713	SC6903PK
A6U5	1820-0307		IC:DIGITAL DTL HEX INVERTER	04713	MC836P
A6U6	1820-0307		IC:DIGITAL DTL HEX INVERTER	04713	MC836P
A6U7	1820-0307		IC:DIGITAL DTL HEX INVERTER	04713	MC836P
A6U8	1820-0094		IC:DTL QUAD 2-INPUT GATE	04713	SC6903PK
A6U9	1820-0310		IC:DTL TRIPLE 3-INPUT NAND GATE	04713	SC6910PK
A6U10	1820-0094		IC:DTL QUAD 2-INPUT GATE	04713	SC6903PK
A6U11	1820-0307		IC:DIGITAL DTL HEX INVERTER	04713	MC836P
A6U12	1820-0256		IC:DTL QUAD 2-INPUT POWER GATE	04713	MC858P
A6U13	1820-0094		IC:DTL QUAD 2-INPUT GATE	04713	SC6903PK
A6U14	1820-0256		IC:DTL QUAD 2-INPUT POWER GATE	04713	MC858P
A6U15	1820-0207		IC:TTL MONOSTABLE MULTIVIBRATOR	28480	1820-0207
A6U16	1820-0094		IC:DTL QUAD 2-INPUT GATE	04713	SC6903PK
A6U17	1820-0307		IC:DIGITAL DTL HEX INVERTER	04713	MC836P
A6U18	1820-0094		IC:DTL QUAD 2-INPUT GATE	04713	SC6903PK
A6U19	1820-0094		IC:DTL QUAD 2-INPUT GATE	04713	SC6903PK
A7			OPTIONAL		
A8			OPTIONAL		
A9	1150-0398	1	BOARD ASSY:SHIFT REGISTER #1 & #2	50436	1150-0398
A9C1	1150-0411	1	REBUILT 1150-0398,REQUIRES EXCHANGE	50436	1150-0411
A9C2	0160-0153		C:FXD MY 0.001 UF 10% 200VDCW	56289	192P10292-PTS
A9C3	0180-0300		C:FXD AL ELECT 20 UF +75-10% 15VDCW	56289	30D206G015B82-DSM
A9C4	0160-3060		C:FXD CER 0.1 UF 20% 25VDCW	56289	3C42A-CML
A9C5			NOT ASSIGNED		
A9C6			C:FXD CER 0.1 UF 20% 25VDCW	56289	3C42A-CML
A9C7	0160-3060		C:FXD CER 0.1 UF 20% 25VDCW	56289	3C42A-CML
A9R1	0683-1025		R:FXD COMP 1000 OHM 5% 1/4W	01121	CB 1025
A9R2	0683-5125		R:FXD COMP 5100 OHM 5% 1/4W	01121	CB 5125
A9R3	0683-5125		R:FXD COMP 5100 OHM 5% 1/4W	01121	CB 5125
A9R4	0683-5125		R:FXD COMP 5100 OHM 5% 1/4W	01121	CB 5125
A9R5	0683-5125		R:FXD COMP 5100 OHM 5% 1/4W	01121	CB 5125
A9R6	0683-5125		R:FXD COMP 5100 OHM 5% 1/4W	01121	CB 5125

See introduction to this section for ordering information

Table 7-2. Replaceable Parts

Reference Designation	HP Part Number	Qty	Description	Mfr Code	Mfr Part Number
A9R7	0683-5125	8	R:FX0 COMP 5100 OHM 5% 1/4W	01121	CB 5125
A9R8	0683-5125		R:FXD COMP 5100 OHM 5% 1/4W	01121	CB 5125
A9R9	0683-5125		R:FX0 COMP 5100 OHM 5% 1/4W	01121	CB 5125
A9U1	1820-0258		IC:OTL DUAL CLOCKED J-K F/F	04713	MC852P
A9U2	1820-0258	11	IC:OTL DUAL CLOCKED J-K F/F	04713	MC852P
A9U3	1820-0258		IC:OTL DUAL CLOCKED J-K F/F	04713	MC852P
A9U4	1820-0258		IC:OTL DUAL CLOCKED J-K F/F	04713	MC852P
A9U5	1820-0122		IC:OTL DUAL JK FF	07263	U6A909359X
A9U6	1820-0258		IC:OTL DUAL CLOCKED J-K F/F	04713	MC852P
A9U7	1820-0258		IC:OTL DUAL CLOCKED J-K F/F	04713	MC852P
A9U8	1820-0258		IC:DTL DUAL CLOCKED J-K F/F	04713	MC852P
A9U9	1820-0094	3	IC:OTL QUAD 2-INPUT GATE	04713	SC6903PK
A9U10	1820-0094		IC:OTL QUAD 2-INPUT GATE	04713	SC6903PK
A9U11	1820-0258		IC:OTL DUAL CLOCKED J-K F/F	04713	MC852P
A9U12	1820-0094		IC:OTL QUAD 2-INPUT GATE	04713	SC6903PK
A9U13	1820-0094		IC:OTL QUAD 2-INPUT GATE	04713	SC6903PK
A9U14	1820-0308		IC:OTL CLOCKED FF RL:6K	07263	U6A994559X
A9U15	1820-0094		IC:DTL QUAD 2-INPUT GATE	04713	SC6903PK
A9U16	1820-0094	1	IC:OTL QUAD 2-INPUT GATE	04713	SC6903PK
A9U17	1820-0256		IC:DTL QUAD 2-INPUT POWER GATE	04713	MC858P
A9U18	1820-0256		IC:DTL QUAD 2-INPUT POWER GATE	04713	MC858P
A9U19	1820-0307		IC:OIGITAL OTL HEX INVERTER	04713	MC836P
A9U20	1820-0307		IC:OIGITAL OTL HEX INVERTER	04713	MC836P
A9U21	1820-0094		IC:OTL QUAD 2-INPUT GATE	04713	SC6903PK
A9U22	1820-0094		IC:OTL QUAD 2-INPUT GATE	04713	SC6903PK
A10	1150-0399	1	BOARD ASSY:ON-LINE SYNC CONTROL	50436	1150-0399
A10	1150-0412		REBUILT 1150-0399,REQUIRES EXCHANGE	50436	1150-0412
A10C1	0160-0153		C:FX0 MY 0.001 UF 10% 200VDCW	56289	192P10292-PTS
A10C2	0160-0154		C:FX0 MICA MY 0.0022 UF 10% 200VDCW	56289	192P22292-PTS
A10C3	0160-0153	1	C:FX0 MY 0.001 UF 10% 200VDCW	56289	192P10292-PTS
A10C4	0160-3060		C:FX0 CER 0.1 UF 20% 25VDCW	56289	3C42A-CML
A10C5	0160-3060		C:FXD CER 0.1 UF 20% 25VDCW	56289	3C42A-CML
A10C6	0180-0059		C:FX0 ELECT 10 UF +75-10% 25VDCW	28480	0180-0059
A10C7	0160-3060		C:FXD CER 0.1 UF 20% 25VDCW	56289	3C42A-CML
A10R1	0683-2225		R:FX0 COMP 2.2K OHM 5% 1/4W	01121	CB 2225
A10R2	0683-2225	1	R:FX0 COMP 2.2K OHM 5% 1/4W	01121	CB 2225
A10U1	1820-0256		IC:OTL QUAD 2-INPUT POWER GATE	04713	MC858P
A10U2	1820-0307		IC:OIGITAL OTL HEX INVERTER	04713	MC836P
A10U3	1820-0307		IC:OIGITAL OTL HEX INVERTER	04713	MC836P
A10U4	1820-0307		IC:OIGITAL OTL HEX INVERTER	04713	MC836P
A10U5	1820-0308		IC:DTL CLOCKED FF RL:6K	07263	U6A994559X
A10U6	1820-0307		NOT ASSIGNED		
A10U7	1820-0307	1	IC:OIGITAL OTL HEX INVERTER	04713	MC836P
A10U8	1820-0310		IC:OTL TRIPLE 3-INPUT NAND GATE	04713	SC6910PK
A10U9	1820-0307		IC:OIGITAL OTL HEX INVERTER	04713	MC836P
A10U10	1820-0094		IC:OTL QUAD 2-INPUT GATE	04713	SC6903PK
A10U11	1820-0310		IC:OTL TRIPLE 3-INPUT NAND GATE	04713	SC6910PK
A10U12	1820-0094		IC:OTL QUAD 2-INPUT GATE	04713	SC6903PK
A10U13	1820-0307		IC:OIGITAL OTL HEX INVERTER	04713	MC836P
A10U14	1820-0122	1	IC:OTL DUAL JK FF	07263	U6A909359X
A10U15	1820-0094		IC:OTL QUAD 2-INPUT GATE	04713	SC6903PK
A10U16	1820-0310		IC:OTL TRIPLE 3-INPUT NAND GATE	04713	SC6910PK
A10U17	1820-0086		IC:OTL DUAL 4-INPUT GATE (EXPANDABLE)	04713	SC6900PK
A10U18	1820-0307		IC:OIGITAL OTL HEX INVERTER	04713	MC836P
A11	1150-0400		BOARD ASSY:MODE & STATE DECODE	50436	1150-0400
A11	1150-0413	1	REBUILT 1150-0400,REQUIRES EXCHANGE	50436	1150-0413
A11C1	0160-0154		C:FXD MICA MY 0.0022 UF 10% 200VDCW	56289	192P22292-PTS
A11C2	0160-0153		C:FX0 MY 0.001 UF 10% 200VDCW	56289	192P10292-PTS
A11C3	0160-0153		C:FX0 MY 0.001 UF 10% 200VDCW	56289	192P10292-PTS
A11C4	0180-0059	2	C:FXD ELECT 10 UF +75-10% 25VDCW	28480	0180-0059
A11C5	0160-3060		C:FX0 CER 0.1 UF 20% 25VDCW	56289	3C42A-CML
A11C6	0160-3060		NOT ASSIGNED		
A11C7	0160-3060		C:FXD CER 0.1 UF 20% 25VDCW	56289	3C42A-CML
A11C8	0160-3060		NOT ASSIGNED		
A11C9	0160-3060		C:FXD CER 0.1 UF 20% 25VDCW	56289	3C42A-CML
A11R1	0683-5125	2	R:FXD COMP 5100 OHM 5% 1/4W	01121	CB 5125
A11U1	1820-0099		IC:TTL 4-BIT BINARY COUNTER	01295	SN7493N
A11U2	1820-0122		IC:OTL DUAL JK FF	07263	U6A909359X
A11U3	1820-0307		IC:OIGITAL OTL HEX INVERTER	04713	MC836P
A11U4	1820-0094		IC:OTL QUAD 2-INPUT GATE	04713	SC6903PK
A11U5	1820-0086		IC:OTL DUAL 4-INPUT GATE (EXPANDABLE)	04713	SC6900PK
A11U6	1820-0094		IC:OTL QUAD 2-INPUT GATE	04713	SC6903PK
A11U7	1820-0094	1	IC:OTL QUAD 2-INPUT GATE	04713	SC6903PK
A11U8	1820-0099		IC:TTL 4-BIT BINARY COUNTER	01295	SN7493N
A11U9	1820-0307		IC:OIGITAL OTL HEX INVERTER	04713	MC836P

See introduction to this section for ordering information

Table 7-2. Replaceable Parts

Reference Designation	HP Part Number	Qty	Description	Mfr Code	Mfr Part Number
A11U10	1820-0310	1	IC:DTL TRIPLE 3-INPUT NAND GATE	04713	SC6910PK
A11U11	1820-0094		IC:DTL QUAD 2-INPUT GATE	04713	SC6903PK
A11U12	1820-0307		IC:DIGITAL DTL HEX INVERTER	04713	MC836P
A11U13	1820-0094		IC:DTL QUAD 2-INPUT GATE	04713	SC6903PK
A11U14	1820-0122		IC:DTL DUAL JK FF	07263	U6A909359X
A11U15	1820-0094		IC:DTL QUAD 2-INPUT GATE	04713	SC6903PK
A11U16	1820-0307		IC:DIGITAL DTL HEX INVERTER	04713	MC836P
A11U17	1820-0310		IC:DTL TRIPLE 3-INPUT NAND GATE	04713	SC6910PK
A11U18	1820-0307		IC:DIGITAL DTL HEX INVERTER	04713	MC836P
A11U19	1820-0307		IC:DIGITAL DTL HEX INVERTER	04713	MC836P
A11U20	1820-0307		IC:DIGITAL DTL HEX INVERTER	04713	MC836P
A12	1150-0401		BOARD ASSY:TTY CONTROL	50436	1150-0401
A12	1150-0414		REBUILT 1150-0401,REQUIRES EXCHANGE	50436	1150-0414
A12C1	0180-0197		C:FXD ELECT 2.2 UF 10% 20VDCW	56289	1500225X9020A2-DYS
A12C2	0160-0154		C:FXD MICA MY 0.0022 UF 10% 200VDCW	56289	192P22292-PTS
A12C3			NOT ASSIGNED		
A12C4	0160-3060		C:FXD CER 0.1 UF 20% 25VDCW	56289	3C42A-CML
A12C5			NOT ASSIGNED		
A12C6	0160-3060		C:FXD CER 0.1 UF 20% 25VDCW	56289	3C42A-CML
A12C7			NOT ASSIGNED		
A12C8	0180-0059		C:FXD ELECT 10 UF +75-10% 25VDCW	28480	0180-0059
A12C9	0160-3060		C:FXD CER 0.1 UF 20% 25VDCW	56289	3C42A-CML
A12C10			NOT ASSIGNED		
A12C11	0160-2210		C:FXD MICA 470 PF 5%	28480	0160-2210
A12C12	0160-2210		C:FXD MICA 470 PF 5%	28480	0160-2210
A12R1	0683-4725	3	R:FXD COMP 4700 OHM 5% 1/4W	01121	C8 4725
A12R2	1535-1293		R:VAR WW 5000 OHM PC MOUNT	80294	3009Y-1-502
A12U1	1820-0122		IC:DTL DUAL JK FF	07263	U6A909359X
A12U2	1820-0122		IC:DTL DUAL JK FF	07263	U6A909359X
A12U3	1820-0122		IC:DTL DUAL JK FF	07263	U6A909359X
A12U4	1820-0122		IC:DTL DUAL JK FF	07263	U6A909359X
A12U5	1820-0307		IC:DIGITAL DTL HEX INVERTER	04713	MC836P
A12U6	1820-0086		IC:DTL DUAL 4-INPUT GATE (EXPANDABLE)	04713	SC6900PK
A12U7	1820-0307		IC:DIGITAL DTL HEX INVERTER	04713	MC836P
A12U8	1820-0307		IC:DIGITAL DTL HEX INVERTER	04713	MC836P
A12U9	1820-0086		IC:DTL DUAL 4-INPUT GATE (EXPANDABLE)	04713	SC6900PK
A12U10	1820-0307		IC:DIGITAL DTL HEX INVERTER	04713	MC836P
A12U11	1820-0094		IC:DTL QUAD 2-INPUT GATE	04713	SC6903PK
A12U12	1820-0094		IC:DTL QUAD 2-INPUT GATE	04713	SC6903PK
A12U13	1820-0094		IC:DTL QUAD 2-INPUT GATE	04713	SC6903PK
A12U14	1820-0094		IC:DTL QUAD 2-INPUT GATE	04713	SC6903PK
A12U15	1820-0094		IC:DTL QUAD 2-INPUT GATE	04713	SC6903PK
A12U16	1820-0122		IC:DTL DUAL JK FF	07263	U6A909359X
A12U17	1820-0207		IC:TTL MONOSTABLE MULTIVIBRATOR	28480	1820-0207
A12U18	1820-0094		IC:DTL QUAD 2-INPUT GATE	04713	SC6903PK
A12U19	1820-0307	1	IC:DIGITAL DTL HEX INVERTER	04713	MC836P
A12U20	1820-0094		IC:DTL QUAD 2-INPUT GATE	04713	SC6903PK
A12U21	1820-0310		IC:DTL TRIPLE 3-INPUT NAND GATE	04713	SC6910PK
A13	1150-0402		BOARD ASSY:TAPE DATA CONTROL	50436	1150-0402
A13	1150-0415		REBUILT 1150-0402,REQUIRES EXCHANGE	50436	1150-0415
A13C1	0160-0165		C:FXD MY 0.056 UF 10% 200VDCW	56289	192P56392-PTS
A13C2	0160-0168		C:FXD MY 0.1 UF 10% 200VDCW	56289	192P10492-PTS
A13C3	0160-0889		C:FXD MY 0.33 UF 10% 80VDCW	28480	0160-0889
A13C4	0160-0163		C:FXD MY 0.033 UF 10% 200VDCW	56289	192P33392-PTS
A13C5	0160-0154		C:FXD MICA MY 0.0022 UF 10% 200VDCW	56289	192P22292-PTS
A13C6	0140-0200		C:FXD MICA 390 PF 5%	72136	RDM15F391-J3C
A13C7	0140-0200		C:FXD MICA 390 PF 5%	72136	RDM15F391-J3C
A13C8	0160-0153		C:FXD MY 0.001 UF 10% 200VDCW	56289	192P10292-PTS
A13C9	0180-0059		C:FXD ELECT 10 UF +75-10% 25VDCW	28480	0180-0059
A13C10	0160-3060		C:FXD CER 0.1 UF 20% 25VDCW	56289	3C42A-CML
A13C11			NOT ASSIGNED		
A13C12	0160-3060		C:FXD CER 0.1 UF 20% 25VDCW	56289	3C42A-CML
A13C13			NOT ASSIGNED		
A13C14	0160-3060		C:FXD CER 0.1 UF 20% 25VDCW	56289	3C42A-CML
A13C15	0160-2703		C:FXD MICA 500 PF 5% 500VDCW	00853	RDM19E501J5S
A13C16		1	NOT ASSIGNED		
A13C17			NOT ASSIGNED		
A13C18			NOT ASSIGNED		
A13C19	0160-0153		C:FXD MY 0.001 UF 10% 200VDCW	56289	192P10292-PTS
A13CR1	1901-0040		DIODE:SILICON 30MA 30WV	07263	FDG1088
A13CR2	1901-0040		DIODE:SILICON 30MA 30WV	07263	FDG1088
A13CR3	1901-0040		DIODE:SILICON 30MA 30WV	07263	FDG1088
A13CR4	1901-0040		DIODE:SILICON 30MA 30WV	07263	FDG1088
A13R1	0683-5125		R:FXD COMP 5100 OHM 5% 1/4W	01121	C8 5125
A13R2	1535-1293		R:VAR WW 5000 OHM PC MOUNT	80294	3009Y-1-502

See introduction to this section for ordering information

Table 7-2. Replaceable Parts

Reference Designation	HP Part Number	Qty	Description	Mfr Code	Mfr Part Number
A13R3	0683-1035	10	R:FXO COMP 10K OHM 5% 1/4W	01121	C8 1035
A13R4	0683-5125		R:FXO COMP 5100 OHM 5% 1/4W	01121	C8 5125
A13R5	0683-1035		R:FXO COMP 10K OHM 5% 1/4W	01121	C8 1035
A13R6	0683-4715		R:FXO COMP 470 OHM 5% 1/4W	01121	C8 4715
A13R7	0683-6825		R:FXO COMP 6800 OHM 5% 1/4W	01121	C8 6825
A13R8	1535-1292	2	R:VAR WW 2000 OHM PC MOUNT	80294	3009Y-1-202
A13R9	0683-5125		R:FXO COMP 5100 OHM 5% 1/4W	01121	C8 5125
A13U1	1820-0310		IC:OTL TRIPLE 3-INPUT NAND GATE	04713	SC6910PK
A13U2	1820-0207		IC:TTL MONOSTABLE MULTIVIBRATOR	28480	1820-0207
A13U3	1820-0207		IC:TTL MONOSTABLE MULTIVIBRATOR	28480	1820-0207
A13U4	1820-0207		IC:TTL MONOSTABLE MULTIVIBRATOR	28480	1820-0207
A13U5	1820-0307		IC:DIGITAL OTL HEX INVERTER	04713	MC836P
A13U6	1820-0094		IC:OTL QUAD 2-INPUT GATE	04713	SC6903PK
A13U7	1820-0307		IC:DIGITAL OTL HEX INVERTER	04713	MC836P
A13U8	1820-0086		IC:OTL DUAL 4-INPUT GATE (EXPANDABLE)	04713	SC6900PK
A13U9	1820-0122		IC:OTL DUAL JK FF	07263	U6A909359X
A13U10	1820-0094		IC:OTL QUAD 2-INPUT GATE	04713	SC6903PK
A13U11	1820-0207		IC:TTL MONOSTABLE MULTIVIBRATOR	28480	1820-0207
A13U12	1820-0207		IC:TTL MONOSTABLE MULTIVIBRATOR	28480	1820-0207
A13U13	1820-0307		IC:DIGITAL OTL HEX INVERTER	04713	MC836P
A13U14	1820-0308		IC:OTL CLOCKED FF RL:6K	07263	U6A994559X
A13U15	1820-0094		IC:OTL QUAD 2-INPUT GATE	04713	SC6903PK
A13U16	1820-0122		IC:OTL DUAL JK FF	07263	U6A909359X
A13U17	1820-0094		IC:OTL QUAD 2-INPUT GATE	04713	SC6903PK
A13U18	1820-0307		IC:DIGITAL OTL HEX INVERTER	04713	MC836P
A13U19	1820-0307	1	IC:DIGITAL OTL HEX INVERTER	04713	MC836P
A14	1150-0403		80A80 ASSY:REPRODUCE	50436	1150-0403
A14	1150-0416		REBUILT 1150-0403, REQUIRES EXCHANGE	50436	1150-0416
A14C1	0180-0291		C:FXO ELECT 1.0 UF 10% 35VDCW	56289	150D105X9035A2-OYS
A14C2	0180-1747		C:FXO ELECT 150 UF 20% 15VDCW	28480	0180-1747
A14C3	0160-0154	2	C:FXO MICA MY 0.0022 UF 10% 200VDCW	56289	192P22292-PTS
A14C4	0160-0134		C:FXO MICA 220PF 5% 300VDCW	14655	RDML5F221J3C
A14C5	0180-0059		C:FXO ELECT 10 UF +75-10% 25VDCW	28480	0180-0059
A14C6	0160-0300		C:FXO MY 0.0027 UF 200VDCW	56289	192P27292-PTS
A14C7	0160-0159		C:FXO MY 0.0068 UF 10% 200VDCW	56289	192P68282-PTS
A14C8	0160-0134		C:FXO MICA 220PF 5% 300VDCW	14655	RDML5F221J3C
A14C9	0180-1747		C:FXO ELECT 150 UF 20% 15VDCW	28480	0180-1747
A14C10	0160-0153		C:FXO MY 0.001 UF 10% 200VDCW	56289	192P10292-PTS
A14C11	0160-2205		C:FXO MICA 120 PF 5%	28480	0160-2205
A14C12	0160-0153		C:FXO MY 0.001 UF 10% 200VDCW	56289	192P10292-PTS
A14C13	0160-0153		C:FXO MY 0.001 UF 10% 200VDCW	56289	192P10292-PTS
A14C14	0160-0168		C:FXO MY 0.1 UF 10% 200VDCW	56289	192P10492-PTS
A14C15	0180-0059		C:FXO ELECT 10 UF +75-10% 25VDCW	28480	0180-0059
A14C16	0160-0168		C:FXO MY 0.1 UF 10% 200VDCW	56289	192P10492-PTS
A14C17	0180-0059		C:FXO ELECT 10 UF +75-10% 25VDCW	28480	0180-0059
A14C18	0160-0168		C:FXO MY 0.1 UF 10% 200VDCW	56289	192P10492-PTS
A14C19	0160-0168		C:FXO MY 0.1 UF 10% 200VDCW	56289	192P10492-PTS
A14CR1 & CR2	1910-0031		O100E:GE JEDEC TYPE	93332	1N34A
A14CR3 THRU			NOT ASSIGNED		
A14CR7			NOT ASSIGNED		
A14CR8	1901-0040		O100E:SILICON 30MA 30WV	07263	F0G1088
A14CR9	1901-0040		O100E:SILICON 30MA 30WV	07263	F0G1088
A14CR10	1901-0040		O100E:SILICON 30MA 30WV	07263	F0G1088
A14CR11	1901-0040		O100E:SILICON 30MA 30WV	07263	F0G1088
A14CR12	1901-0040		O100E:SILICON 30MA 30WV	07263	F0G1088
A14CR13	1901-0040		O100E:SILICON 30MA 30WV	07263	F0G1088
A14CR14	1901-0040		O100E:SILICON 30MA 30WV	07263	F0G1088
A14CR15	1901-0040		O100E:SILICON 30MA 30WV	07263	F0G1088
A14CR16	1901-0040		O100E:SILICON 30MA 30WV	07263	F0G1088
A14CR17			NOT ASSIGNED		
A14CR18	1901-0040		O100E:SILICON 30MA 30WV	07263	F0G1088
A14Q1	1853-0036		TSTR:SI PNP	80131	2N3906
A14Q2	1853-0036		TSTR:SI PNP	80131	2N3906
A14Q3	1854-0215		TSTR:SI NPN	80131	2N3904
A14Q4	1854-0215		TSTR:SI NPN	80131	2N3904
A14Q5	1853-0036	1	TSTR:SI PNP	80131	2N3906
A14Q6	1854-0215		TSTR:SI NPN	80131	2N3904
A14R1			NOT ASSIGNED		
A14R2	1535-1295		R:VAR WW 10K OHM PC MOUNT	80294	3009Y-1-103
A14R3	0683-2725		R:FXO COMP 2700 OHM 5% 1/4W	01121	C8 2725
A14R4	0683-1045		R:FXO COMP 100K OHMS 5% 1/4W	01121	C8 1045
A14R5	0683-1225		R:FXO COMP 1200 OHM 5% 1/4W	01121	C8 1225
A14R6	0683-1035		R:FXO COMP 10K OHM 5% 1/4W	01121	C8 1035
A14R7	0683-1035		R:FXO COMP 10K OHM 5% 1/4W	01121	C8 1035
A14R8	0683-1045		R:FXO COMP 100K OHMS 5% 1/4W	01121	C8 1045

See introduction to this section for ordering information

Table 7-2. Replaceable Parts

Reference Designation	HP Part Number	Qty	Description	Mfr Code	Mfr Part Number
A14R9	0683-1525	1	R:FXD COMP 1500 OHM 5% 1/4W	01121	C8 1525
A14R10	0683-1035		R:FXD COMP 10K OHM 5% 1/4W	01121	C8 1035
A14R11	0683-2245		R:FXD COMP 220K OHM 5% 1/4W	01121	C8 2245
A14R12	1535-1294		R:VAR WW 50K OHM PC MOUNT	80294	3009Y-1-503
A14R13	0683-5115		R:FXD COMP 510 OHM 5% 1/4W	01121	C8 5115
A14R14	0683-4725	1	R:FXD COMP 4700 OHM 5% 1/4W	01121	C8 4725
A14R15	0683-1025		R:FXD COMP 1000 OHM 5% 1/4W	01121	C8 1025
A14R16	0683-2735		R:FXD COMP 27K OHM 5% 1/4W	01121	C8 2735
A14R17	0683-1225		R:FXD COMP 1200 OHM 5% 1/4W	01121	C8 1225
A14R18	0683-3335		R:FXD COMP 33K OHM 5% 1/4W	01121	C8 3335
A14R19	0683-1035	1	R:FXD COMP 10K OHM 5% 1/4W	01121	C8 1035
A14R20	0683-1035		R:FXD COMP 10K OHM 5% 1/4W	01121	C8 1035
A14R21	0683-2745		R:FXD COMP 270K OHM 5% 1/4W	01121	C8 2745
A14R22	0683-1045		R:FXD COMP 100K OHMS 5% 1/4W	01121	C8 1045
A14R23	1535-1292		R:VAR WW 2000 OHM PC MOUNT	80294	3009Y-1-202
A14R24	0683-1025	1	R:FXD COMP 1000 OHM 5% 1/4W	01121	C8 1025
A14R25	0683-1635		R:FXD COMP 16K OHM 5% 1/4W	01121	C8 1635
A14R26	0683-1545		R:FXD COMP 150K OHM 5% 1/4W	01121	C8 1545
A14R27	0683-4735		R:FXD COMP 47K OHM 5% 1/4W	01121	C8 4735
A14R28	0683-1035		R:FXD COMP 10K OHM 5% 1/4W	01121	C8 1035
A14R29	0683-1035	2	R:FXD COMP 10K OHM 5% 1/4W	01121	C8 1035
A14R30	0683-2715		R:FXD COMP 270 OHM 5% 1/4W	01121	C8 2715
A14R31	0683-8225		R:FXD COMP 8200 OHMS 5% 1/4W	01121	C8 8225
A14R32	0683-1635		R:FXD COMP 16K OHM 5% 1/4W	01121	C8 1635
A14R33	0683-1035		R:FXD COMP 10K OHM 5% 1/4W	01121	C8 1035
A14R34	0683-1035	4	R:FXD COMP 10K OHM 5% 1/4W	01121	C8 1035
A14R35	0683-2725		R:FXD COMP 2700 OHM 5% 1/4W	01121	C8 2725
A14R36	0683-1025		R:FXD COMP 1000 OHM 5% 1/4W	01121	C8 1025
A14R37	0683-2715		R:FXD COMP 270 OHM 5% 1/4W	01121	C8 2715
A14R38	0683-4705		R:FXD COMP 47 OHM 5% 1/4W	01121	C8 4705
A14R39	0683-4705	5	R:FXD COMP 47 OHM 5% 1/4W	01121	C8 4705
A14U1	1820-0058		IC:LIN. OP. AMP. 15K MIN.(TO-99)	07263	U58770939X
A14U2	1820-0058		IC:LIN. OP. AMP. 15K MIN.(TO-99)	07263	U58770939X
A14U3	1820-0094		IC:DTL QUAO 2-INPUT GATE	04713	SC6903PK
A14U4	1820-0307		IC:OIGITAL OTL HEX INVERTER	04713	MC836P
A15	1150-0404	1	80ARD ASSY:READ/WRITE ELECTRONICS	50436	1150-0404
A15	1150-0417	1	REBUILT 1150-0404,REQUIRES EXCHANGE	50436	1150-0417
A15C1	0160-2307	3	C:FXD MICA 47 PF 5%	28480	0160-2307
A15C2	0140-0199	4	C:FXO MICA 240 PF 5%	28480	0140-0199
A15C3			NOT ASSIGNED		
A15C4			NOT ASSIGNED		
A15C5	0160-2307		C:FXD MICA 47 PF 5%	28480	0160-2307
A15C6	0140-0199		C:FXO MICA 240 PF 5%	28480	0140-0199
A15C7			NOT ASSIGNED		
A15C8			NOT ASSIGNED		
A15C9	0160-2307		C:FXD MICA 47 PF 5%	28480	0160-2307
A15C10	0140-0199		C:FXO MICA 240 PF 5%	28480	0140-0199
A15C11			NOT ASSIGNED		
A15C12			NOT ASSIGNED		
A15C13	0180-0300		C:FXO AL ELECT 20 UF +75-10% 15V0CW	56289	300206G015882-DSM
A15C14	0180-0300		C:FXO AL ELECT 20 UF +75-10% 15V0CW	56289	300206G015882-DSM
A15C15	0160-3060		C:FXO CER 0.1 UF 20% 25V0CW	56289	3C42A-CML
A15C16	0160-3060		C:FXO CER 0.1 UF 20% 25V0CW	56289	3C42A-CML
A15C17	0180-0300		C:FXO AL ELECT 20 UF +75-10% 15V0CW	56289	300206G015882-DSM
A15C18	0160-3060		C:FXO CER 0.1 UF 20% 25V0CW	56289	3C42A-CML
A15CR1	1901-0040		DIODE:SILICON 30MA 30WV	07263	FDG1088
A15CR2	1901-0040		DIODE:SILICON 30MA 30WV	07263	FDG1088
A15CR3	1901-0040		DIODE:SILICON 30MA 30WV	07263	FDG1088
A15CR4			NOT ASSIGNED		
A15CR5	1901-0040		DIODE:SILICON 30MA 30WV	07263	FDG1088
A15CR6			NOT ASSIGNED		
A15CR7			NOT ASSIGNED		
A15CR8	1901-0040		DIODE:SILICON 30MA 30WV	07263	FDG1088
A15CR9	1901-0040		DIODE:SILICON 30MA 30WV	07263	FDG1088
A15CR10	1901-0040		DIODE:SILICON 30MA 30WV	07263	FDG1088
A15CR11	1901-0040		DIODE:SILICON 30MA 30WV	07263	FDG1088
A15CR12	1901-0040		DIODE:SILICON 30MA 30WV	07263	FDG1088
A15CR13			NOT ASSIGNED		
A15CR14			NOT ASSIGNED		
A15CR15	1901-0040		DIODE:SILICON 30MA 30WV	07263	FDG1088
A15CR16	1901-0040		DIODE:SILICON 30MA 30WV	07263	FDG1088
A15CR17	1901-0040		DIODE:SILICON 30MA 30WV	07263	FDG1088
A15CR18	1901-0040		DIODE:SILICON 30MA 30WV	07263	FDG1088
A15CR19	1901-0040		DIODE:SILICON 30MA 30WV	07263	FDG1088
A15Q1	1853-0036		TSTR:SI PNP	80131	2N3906

See introduction to this section for ordering information

Table 7-2. Replaceable Parts

Reference Designation	HP Part Number	Qty	Description	Mfr Code	Mfr Part Number
A15Q2	1853-0036	3	TSTR:SI PNP	80131	2N3906
A15Q3	1535-1309		TRANSISTOR	01295	2N1303
A15Q4	1853-0036		TSTR:SI PNP	80131	2N3906
A15Q5	1853-0036		TSTR:SI PNP	80131	2N3906
A15Q6	1853-0036		TSTR:SI PNP	80131	2N3906
A15Q7	1535-1309		TRANSISTOR	01295	2N1303
A15Q8	1853-0036		TSTR:SI PNP	80131	2N3906
A15Q9	1853-0036		TSTR:SI PNP	80131	2N3906
A15Q10	1853-0036		TSTR:SI PNP	80131	2N3906
A15Q11	1535-1309		TRANSISTOR	01295	2N1303
A15Q12	1853-0036		TSTR:SI PNP	80131	2N3906
A15R1	0683-2225		R:FXD COMP 2.2K OHM 5% 1/4W	01121	CB 2225
A15R2	0683-4715		R:FXD COMP 470 OHM 5% 1/4W	01121	CB 4715
A15R3	0683-4715		R:FXD COMP 470 OHM 5% 1/4W	01121	CB 4715
A15R4	0683-2225		R:FXD COMP 2.2K OHM 5% 1/4W	01121	CB 2225
A15R5	0683-3925	3	R:FXD COMP 3900 OHM 5% 1/4W	01121	CB 3925
A15R6	0683-3925		R:FXD COMP 3900 OHM 5% 1/4W	01121	CB 3925
A15R7	0683-1035		R:FXD COMP 10K OHM 5% 1/4W	01121	CB 1035
A15R8	0683-3315		R:FXD COMP 330 OHM 5% 1/4W	01121	CB 3315
A15R9			NOT ASSIGNED		
A15R10	0683-4325	10	R:FXD COMP 4300 OHM 5% 1/4W	01121	CB 4325
A15R11			NOT ASSIGNED		
A15R12	0683-4325		R:FXD COMP 4300 OHM 5% 1/4W	01121	CB 4325
A15R13	0683-3625		R:FXD COMP 3600 OHM 5% 1/4W	01121	CB 3625
A15R14	1535-1291		R:VAR WW 1000 OHM PC MOUNT	80294	3009Y-1-102
A15R15	0683-1525	3	R:FXD COMP 1500 OHM 5% 1/4W	01121	CB 1525
A15R16			NOT ASSIGNED		
A15R17	0683-4745		R:FXD COMP 470K OHM 5% 1/4W	01121	CB 4745
A15R18			NOT ASSIGNED		
A15R19			NOT ASSIGNED		
A15R20	0683-1015		R:FXD COMP 100 OHM 5% 1/4W	01121	CB 1015
A15R21			NOT ASSIGNED		
A15R22			NOT ASSIGNED		
A15R23	0683-4325		R:FXD COMP 4300 OHM 5% 1/4W	01121	CB 4325
A15R24	0683-1025		R:FXD COMP 1000 OHM 5% 1/4W	01121	CB 1025
A15R25	0683-2225	7	R:FXD COMP 2.2K OHM 5% 1/4W	01121	CB 2225
A15R26	0683-6205		R:FXD COMP 62 OHM 5% 1/4W	01121	CB 6205
A15R27	0683-4715		R:FXD COMP 470 OHM 5% 1/4W	01121	CB 4715
A15R28	0683-2225		R:FXD COMP 2.2K OHM 5% 1/4W	01121	CB 2225
A15R29	1535-1290		R:VAR WW 100K OHM PC MOUNT	80294	1535-1290
A15R30	0683-2225		R:FXD COMP 2.2K OHM 5% 1/4W	01121	CB 2225
A15R31	0683-4715		R:FXD COMP 470 OHM 5% 1/4W	01121	CB 4715
A15R32	0683-4715		R:FXD COMP 470 OHM 5% 1/4W	01121	CB 4715
A15R33	0683-2225		R:FXD COMP 2.2K OHM 5% 1/4W	01121	CB 2225
A15R34	0683-3925		R:FXD COMP 3900 OHM 5% 1/4W	01121	CB 3925
A15R35	0683-3925		R:FXD COMP 3900 OHM 5% 1/4W	01121	CB 3925
A15R36	0683-1035		R:FXD COMP 10K OHM 5% 1/4W	01121	CB 1035
A15R37	0683-3315		R:FXD COMP 330 OHM 5% 1/4W	01121	CB 3315
A15R38			NOT ASSIGNED		
A15R39	0683-4325		R:FXD COMP 4300 OHM 5% 1/4W	01121	CB 4325
A15R40			NOT ASSIGNED		
A15R41	0683-4325		R:FXD COMP 4300 OHM 5% 1/4W	01121	CB 4325
A15R42	0683-3625		R:FXD COMP 3600 OHM 5% 1/4W	01121	CB 3625
A15R43	1535-1291		R:VAR WW 1000 OHM PC MOUNT	80294	3009Y-1-102
A15R44	0683-1525		R:FXD COMP 1500 OHM 5% 1/4W	01121	CB 1525
A15R45			NOT ASSIGNED		
A15R46	0683-4745		R:FXD COMP 470K OHM 5% 1/4W	01121	CB 4745
A15R47			NOT ASSIGNED		
A15R48			NOT ASSIGNED		
A15R49	0683-1015		R:FXD COMP 100 OHM 5% 1/4W	01121	CB 1015
A15R50			NOT ASSIGNED		
A15R51			NOT ASSIGNED		
A15R52	0683-4325		R:FXD COMP 4300 OHM 5% 1/4W	01121	CB 4325
A15R53	0683-1025		R:FXD COMP 1000 OHM 5% 1/4W	01121	CB 1025
A15R54			NOT ASSIGNED		
A15R55	0683-6205		R:FXD COMP 62 OHM 5% 1/4W	01121	CB 6205
A15R56	0683-4715		R:FXD COMP 470 OHM 5% 1/4W	01121	CB 4715
A15R57	0683-2225		R:FXD COMP 2.2K OHM 5% 1/4W	01121	CB 2225
A15R58	1535-1290		R:VAR WW 100K OHM PC MOUNT	80294	1535-1290
A15R59	0683-2225		R:FXD COMP 2.2K OHM 5% 1/4W	01121	CB 2225
A15R60	0683-4715		R:FXD COMP 470 OHM 5% 1/4W	01121	CB 4715
A15R61	0683-4715		R:FXD COMP 470 OHM 5% 1/4W	01121	CB 4715
A15R62	0683-2225		R:FXD COMP 2.2K OHM 5% 1/4W	01121	CB 2225
A15R63	0683-3925		R:FXD COMP 3900 OHM 5% 1/4W	01121	CB 3925
A15R64	0683-3925		R:FXD COMP 3900 OHM 5% 1/4W	01121	CB 3925

See introduction to this section for ordering information

Table 7-2. Replaceable Parts

Reference Designation	HP Part Number	Qty	Description	Mfr Code	Mfr Part Number
A15R65 A15R66 A15R67 A15R68 A15R69	0683-1035 0683-3315 0683-4325 0683-4325		R:FXD COMP 10K OHM 5% 1/4W R:FXD COMP 330 OHM 5% 1/4W R:FXD COMP 4300 OHM 5% 1/4W R:FXD COMP 4300 OHM 5% 1/4W NOT ASSIGNED	01121 01121 01121 01121	CB 1035 CB 3315 CB 4325 CB 4325
A15R70 A15R71 A15R72 A15R73 A15R74	0683-4325 0683-3625 1535-1291 0683-1525		R:FXD COMP 4300 OHM 5% 1/4W R:FXD COMP 3600 OHM 5% 1/4W R:VAR WW 1000 OHM PC MOUNT R:FXD COMP 1500 OHM 5% 1/4W NOT ASSIGNED	01121 01121 80294 01121	CB 4325 CB 3625 3009Y-1-102 CB 1525
A15R75 A15R76 A15R77 A15R78 A15R79	0683-4745 0683-1015		R:FXD COMP 470K OHM 5% 1/4W NOT ASSIGNED NOT ASSIGNED R:FXD COMP 100 OHM 5% 1/4W NOT ASSIGNED	01121 01121	CB 4745 CB 1015
A15R80 A15R81 A15R82 A15R83 A15R84	0683-4325 0683-1025 0683-6205		NOT ASSIGNED R:FXD COMP 4300 OHM 5% 1/4W R:FXD COMP 1000 OHM 5% 1/4W NOT ASSIGNED R:FXD COMP 62 OHM 5% 1/4W	01121 01121 01121	CB 4325 CB 1025 CB 6205
A15R85 A15R86 A15R87 A15R88 A15R89	0683-4715 0683-2225 1535-1290 0683-0275 0683-0275		R:FXD COMP 470 OHM 5% 1/4W R:FXD COMP 2.2K OHM 5% 1/4W R:VAR WW 100K OHM PC MOUNT R:FXD COMP 2.7 OHM 5% 1/4W R:FXD COMP 2.7 OHM 5% 1/4W	01121 01121 80294 01121 01121	CB 4715 CB 2225 1535-1290 CB 2765 CB 2765
A15U1 A15U2 A15U3 A15U4 A15U5	1820-0256 1820-0256 1820-0256 1820-0058 1820-0058		IC:DTL QUAD 2-INPUT POWER GATE IC:DTL QUAD 2-INPUT POWER GATE IC:DTL QUAD 2-INPUT POWER GATE IC:LIN. OP. AMP. 15K MIN.(TO-99) IC:LIN. OP. AMP. 15K MIN.(TO-99)	04713 04713 04713 07263 07263	MC858P MC858P MC858P U5B770939X U5B770939X
A15U6 A16	1820-0058		IC:LIN. OP. AMP. 15K MIN.(TO-99) NOT ASSIGNED	07263	U5B770939X
A21 A22	THRU 1150-0405	1	NOT ASSIGNED BDARO ASSY:POWER SUPPLY REGULATOR	50436	1150-0405
A22 A22C1 A22C2 A22C3 A22C4	1150-0418 0180-0339 0160-0168 0180-0197 0160-0168	1	REBUILT 1150-0405,REQUIRES EXCHANGE C:FXO AL ELECT 50 UF +75-10% 15VDCW C:FXO MY 0.1 UF 10% 200VDCW C:FXO ELECT 2.2 UF 10% 20VDCW C:FXO MY 0.1 UF 10% 200VDCW	50436 56289 56289 56289 56289	1150-0418 30D5066015CB2-DSM 192P10492-PTS 150D225X9020A2-OYS 192P10492-PTS
A22C5 A22C6 A22C7 A22C8 A22C9	0180-0291 0160-2703 0160-0161 0180-0339 0160-0168		C:FXO ELECT 1.0 UF 10% 35VDCW C:FXO MICA 500 PF 5% 500VDCW C:FXO MY 0.01 UF 10% 200VDCW C:FXO AL ELECT 50 UF +75-10% 15VDCW C:FXO MY 0.1 UF 10% 200VDCW	56289 00853 56289 56289 56289	150D105X9035A2-DYS RDM19E501J55 192P10392-PTS 30D5066015CB2-DSM 192P10492-PTS
A22C10 A22C11 A22C12 A22C13 A22C14	0160-2703 0180-0291 0160-0168 0180-0291 0160-2703		C:FXD MICA 500 PF 5% 500VDCW C:FXD ELECT 1.0 UF 10% 35VDCW C:FXO MY 0.1 UF 10% 200VDCW C:FXO ELECT 1.0 UF 10% 35VDCW C:FXO MICA 500 PF 5% 500VDCW	00853 56289 56289 56289 00853	RDM19E501J55 150D105X9035A2-DYS 192P10492-PTS 150D105X9035A2-DYS RDM19E501J55
A22C15 A22C16 A22CR1 A22CR2 A22CR3	0160-0168 0180-0339 1901-1013 1535-1254 1535-1253	1 1 1 1	C:FXD MY 0.1 UF 10% 200VDCW C:FXD AL ELECT 50 UF +75-10% 15VDCW DIODE DIODE:SCR DIODE:ZENER	56289 56289 28480 04713 04713	192P10492-PTS 30D5066015CB2-DSM 1901-1013 MCR407-1 1N5234A
A22CR4 A22CR5 A22CR6 A22Q1 A22Q2	1901-0040 1901-0040 1535-1252 1535-1312 1854-0425	1 1 3 1	DIODE:SILICON 30MA 30WV DIODE:SILICON 30MA 30WV DIODE TRANSISTOR TSTR:SI NPN	07263 07263 04713 04713 28480	FDG1088 FDG1088 1N4740A 2N4921 1854-0425
A22Q3 A22Q4 A22Q5 A22R1 A22R2	1853-0084 1535-1312 1535-1312 0811-2097 0683-6205	1 1 1 1	TSTR:SI PNP TRANSISTOR TRANSISTOR R:FXD WW 0.25 OHM 3% 5W R:FXD COMP 62 OHM 5% 1/4W	80131 04713 04713 28480 01121	2N4918 2N4921 2N4921 0811-2097 CB 6205
A22R3 A22R4 A22R5 A22R6 A22R7	0683-4705 0683-4705 0683-6205 1535-1291 0683-5125		R:FXD COMP 47 OHM 5% 1/4W R:FXD COMP 47 OHM 5% 1/4W R:FXD COMP 62 OHM 5% 1/4W R:VAR WW 1000 OHM PC MOUNT R:FXD COMP 5100 OHM 5% 1/4W	01121 01121 01121 80294 01121	CB 4705 CB 4705 CB 6205 3009Y-1-102 CB 5125
A22R8 A22R9 A22R10 A22R11 A22R12	0683-2225 0683-3925 1535-1293 0683-1825 0686-2715	1	R:FXD COMP 2.2K OHM 5% 1/4W R:FXD COMP 3900 OHM 5% 1/4W R:VAR WW 5000 OHM PC MOUNT R:FXD COMP 1800 OHM 5% 1/4W R:FXD COMP 270 OHM 5% 1/2W	01121 01121 80294 01121 01121	CB 2225 CB 3925 3009Y-1-502 CB 1825 EB 2715

See introduction to this section for ordering information

Table 7-2. Replaceable Parts

Reference Designation	HP Part Number	Qty	Description	Mfr Code	Mfr Part Number
A22R13	0811-1984	1	R:FXO WW 10 OHM 5% 5W	28480	0811-1984
A22R14	0698-3547		R:FXO COMP 1 OHM 5% 1/2W	01121	EB 10G5
A22R15	0683-6205		R:FXO COMP 62 OHM 5% 1/4W	01121	CB 6205
A22R16	0683-1225		R:FXO COMP 1200 OHM 5% 1/4W	01121	CB 1225
A22R17	1535-1291		R:VAR WW 1000 OHM PC MOUNT	80294	3009Y-1-102
A22R18	0683-1825	1	R:FXO COMP 1800 OHM 5% 1/4W	01121	CB 1825
A22R19	0683-2225		R:FXD COMP 2.2K OHM 5% 1/4W	01121	CB 2225
A22R20	1535-1291		R:VAR WW 1000 OHM PC MOUNT	80294	3009Y-1-102
A22R21	0683-1025		R:FXD COMP 1000 OHM 5% 1/4W	01121	CB 1025
A22R22	0686-2025		R:FXD COMP 2000 OHM 5% 1/2W	01121	EB 2025
A22R23	0698-3547		R:FXD COMP 1 OHM 5% 1/2W	01121	EB 10G5
A22R24	1535-1291		R:VAR WW 1000 OHM PC MOUNT	80294	3009Y-1-102
A22R25	0683-1225		R:FXD COMP 1200 OHM 5% 1/4W	01121	CB 1225
A22R26	0683-6205		R:FXO COMP 62 OHM 5% 1/4W	01121	CB 6205
A22R27	0683-1025		R:FXO COMP 1000 OHM 5% 1/4W	01121	CB 1025
A22R28	1535-1291	3	R:VAR WW 1000 OHM PC MOUNT	80294	3009Y-1-102
A22R29	0683-2225		R:FXD COMP 2.2K OHM 5% 1/4W	01121	CB 2225
A22R30	0683-1825		R:FXO COMP 1800 OHM 5% 1/4W	01121	CB 1825
A22U1	1820-0196		IC:LINEAR VOLTAGE REGULATOR(INPUT)	28480	1820-0196
A22U2	1820-0196		IC:LINEAR VOLTAGE REGULATOR(INPUT)	28480	1820-0196
A22U3	1820-0196		IC:LINEAR VOLTAGE REGULATOR(INPUT)	28480	1820-0196

See introduction to this section for ordering information

Table 7-2. Replaceable Parts

Reference Designation	HP Part Number	Qty	Description	Mfr Code	Mfr Part Number
	1535-1339		MISCELLANECUS PARTS		
	1535-1313		FUSE:3 AG 3AMP, SLO-BLO		
	1535-10035		DUST COVER:SIDE		
	1535-1318		DUST COVER:FOR TOP OR BOTTM		
			ID PLATE #1		
	1535-1319		ID PLATE #2		
	1535-1320		ID PLATE #3		
	1535-1324		M/F Q3-Q6-2043 MOLEX P/S PLUG		
	1535-1328		CONNECTOR:RECPT, MOLEX		
	1535-1329		CONNECTOR:RECPT, MOLEX		
	1535-1330		CONNECTOR:RECPT, 9 PIN WINCHESTER		
	1535-1331		CONNECTOR:RECPT, 50PIN WINCHESTER		
	1535-1332		CONNECTOR:26 PIN, 3M		
	1535-1333		CONNECTOR:RECPT, ELCO		
	1535-1334		CONNECTOR:22 PIN, AMPHENOL		
	1535-1335		CONTACT PIN RECPT, MOLEX		
	1535-1336		CONTACT PIN PLUG, MOLEX		
	1535-1337		CONTACT SOCKET, WINCHESTER(I/O)		
	1535-1338		CONTACT PIN, WINCHESTER (I/O)		
	1535-1344		SWITCH(ON-LINE)		
	1535-1345		SWITCH (OFF-LINE)		
	1535-1346		SWITCH(REWIND)		
	1535-1347		SWITCH(READ)		
	1535-1348		SWITCH(WRITE)		
	1535-1349		SWITCH(HALT)		
	1535-1350		SWITCH, #1		
	1535-1351		SWITCH, #2		
	1535-1352		SWITCH, #3		
	1535-1353		SWITCH(POWER)		
	1535-1321		SIDE FRAMES WITH HANDLES		
	9162-0044		CASSETTE CARTRIDGE(BLANK, 300 FT)		
	9162-0048		CASSETTE CARTRIDGE (BLANK, 150 FT)		
	1150-0406		TAPE TRANSPORT MODULE		
	1150-0419		REBUILT TRANSPORT		
	1150-0219		CAPSTAN/CLUTCH ASSY		
217	1535-1340		SHROUD, CASSETTE LOADER		
270	1535-1355		LINK RETAINER(REWIND)		
271	1535-1356		LINK(HEAD ACTUATOR)		
274	1535-1357		LINK(REWIND)		
279	1535-1358		PULLEY(MAIN DRIVE, 60 HZ) —		
281	1535-1359		WASHER(LATCH SPRING HEAD-IN)		
287	1150-0221		PC BOARD ASSY(PHOTO SENSOR)		
288	1535-1361		SWITCH, CHERRY		
289	1150-0222		BOT/EQT LAMP ASSY		
295	1150-0269		RECORDING HEAD ASSY		
296	1150-0224		PULLEY ASSY(FORWARD/REWIND)		
297	1150-0225		HEAD ARM ACTUATOR ASSY		
298	1535-1362		SPRING(HEAD LATCH)		
299	1150-0226		HEAD LATCH ASSY(GUILLOTINE)		
300	1150-0227		LOADER LATCH ASSY		
301	1150-0228		LAMPHOLDER SHROUD ASSY(READY)		
302	1150-0229		SOLENOID PLUNGER ASSY(HEAD OUT)		
303	1150-0230		SOLENOID PLUNGER ASSY(HEAD IN)		
304	1150-0231		PIVOT MOUNT ASSY(LOADER LINKAGE)		
305	1150-0232		VIBRATION DAMPER ASSY		
306	1150-0233		CONNECTOR BOARD ASSY		
307	1150-0234		ACTUATOR ASSY(CIP SWITCH)		
308	1150-0235		ACTUATOR ASSY(WLO SWITCH)		
309	1535-1363		LENS(READY LIGHT)		
310	1535-1364		SPRING, TORSION HEAD ARM		
311	1535-1365		SPRING(REWIND)		
312	1535-1366		SPRING(REWIND RETURN)		
313	1150-0236		PINCH ROLLER ASSY		
314	1535-1367		LEVER, CASSETTE EJECT(MODIFIED)		
315	1535-1368		WASHER, LOCKING(CLEAR)		
316	1535-1369		WASHER, SPACING(STEEL)		
317	1535-1370		WASHER, SPACING(WHITE)		
318	1535-1371		SPACER(REWIND WHEEL)		
319	1535-1372		WASHER, THRUST(PINCH ROLLER)		
320	1535-1373		PAD(PRESSURE)		
321	1535-1374		SPACER(ARM RETAINER)		
322	1535-1375		SPRING(HEAD ACTUATOR)		
323	1535-1376		SUPPLY REEL		
324	1535-1377		SPRING(FORWARD TAKE-UP)		
325	1535-1378		BLOCK, HEAD ARM HOLD DOWN(MODIFIED)		

See introduction to this section for ordering information

Table 7-2. Replaceable Parts

Reference Designation	HP Part Number	Qty	Description	Mfr Code	Mfr Part Number
326	1535-1379		COVER, LOADER(MODIFIED)		
327	1535-1380		SPRING(LOADER TENSION)		
329	1535-1362		LINK(FORWARD TAKE-UP)		
330	1150-0237		TACHOMETER CONTACT ASSY		
331	1535-1383		SWITCH(LOADER POSITION)		
332	1535-1384		SWITCH(LOADER EJECT)		
333	1535-1385		REEL DRIVER ASSY(REWIND)		
334	1535-1386		TAB(CASSETTE LOADING)		
335	1535-1387		LINKAGE, MAIN(LOADER)REQUIRES 1535-1425		
336	1535-1388		LINKAGE, IDLER-REQUIRES 1535-1425		
337	1535-1389		LEVER(CASSETTE POSITIONING)		
338	1535-1390		SPRING(LEVER TENSION)		
340	1535-1391		RETAINER CAP, TURNABLE		
341	1535-1392		SPRING, REEL CATCH		
342	1535-1393		SPRING, ROLLER PRESSURE		
343	1535-1394		CATCH, HUB SUPPLY		
344	1535-1395		FORWARD TAKE-UP REEL		
345	1535-1396		REEL DRIVER ASSY(FORWARD TAKE-UP)		
346	1150-0238		DRIVE TIRE		
347	1535-1397		CAPACITOR, MYLAR,2.0 MFD 103 400V		
350	1535-1398		CONNECTOR(CLUTCH EQT/BOT,RWD SOL)		
357	1535-1399		CONNECTOR,(CLUTCH EQT/BOT, RWD SOL)		
358	1535-1400		CONNECTOR, MOTOR(AC POWER)		
359	1535-1401		DIODE		
360	1535-1402		DIODE		
364	1535-1403		LAMP		
367	1535-1404		MOTOR(DRIVE)		
372	1535-1405		O-RING, REWIND TURN AROUND		
373	1535-1406		O-RING, REWIND PULLEY DRIVE		
374	1535-1407		O-RING, MOTOR DRIVE		
375	1535-1408		O-RING, JACKSHAFT DRIVE		
383	1535-1409		RETAINING RING		
384	1535-1410		RETAINING RING		
385	1535-1411		RETAINING RING		
386	1535-1412		RETAINING RING		
387	1535-1413		RETAINING RING		
388	1535-1414		RETAINING RING		
389	1535-1415		RETAINING RING		
390	1535-1416		RETAINING RING		
391	1535-1417		RETAINING RING		
392	1535-1418		RETAINING RING		
433	1535-1419		HEAD-IN SOLENOID(INT, DUTY)		
434	1535-1420		HEAD-OUT SOLENOID(INT, DUTY)		
435	1535-1421		REWIND SOLENOID(CONT DUTY)		
437	1535-1422		SPRING, LOADER LATCH		
438	1535-1423		TRANSISTOR, EQT/BOT PHOTO SENSITIVE		
457	1150-0239		BUFFER SPRING/PRESSURE PAD ASSY		
458	1535-1424		WASHER,SPLIT-LOCK #3		
459	1535-1425		SCREW, PIVOT, SHOULDER		
460	1535-1426		SCREW, PIVOT, HEADLESS		

Table 7-3. Code List of Manufacturers

MFR NO.	MANUFACTURER NAME	ADDRESS	ZIP CODE
00853	SANGAM ELECTRIC CO. PICKENS DIV.	PICKENS, S.C.	29671
01121	ALLEN BRADLEY CO.	MILWAUKEE, WIS.	53204
01295	TEXAS INSTRUMENTS INC. SEMICONDUCTOR COMPONENTS DIV.	DALLAS, TEX.	75231
04713	MOTOROLA SEMICONDUCTOR PROD. INC.	PHOENIX, ARIZ.	85008
07263	FAIRCHILD CAMERA & INST. CORP. SEMICONDUCTOR DIV.	MOUNTAIN VIEW, CALIF.	94040
14655	CORNELL DUBILIER ELECT. DIV. FEDERAL PACIFIC ELECT. CO.	NEWARK, N.J.	07105
28480	HEWLETT-PACKARD CO. CORPORATE HQ	PALO ALTO, CALIF.	94304
50436	HEWLETT-PACKARD CO. MICROWAVE DIV	PALO ALTO, CALIF	94304
50284	SPRAGUE ELECTRIC CO.	N. ADAMS, MASS.	01247
72136	ELECTRO MOTIVE MFG. CO. INC.	WILLIMANTIC, CONN.	06226
80131	ELECTRONIC INDUSTRIES ASSOCIATION	WASHINGTON D.C.	20006
80294	BOURNS INC.	RIVERSIDE, CALIF.	92507
93332	SYLVANIA ELECTRIC PROD. INC. SEMICONDUCTOR DIV.	WOBURN, MASS.	01801

See introduction to this section for ordering information

APPENDIX A TEST POINTS*Table A-1. Test Points (1 of 4)*

Test Point	Signal Name	Signal Function	Conditions Set For Signal Description	Signal Description	Malfunction Symptom	Troubleshooting
A1TP2 A1TP2 A3TP2	RAISE HEADS	Activates heads-out solenoid.	1. Heads in or out. 2. Heads in motion.	1. +28V. 2. +.2V.	Heads do not pull away from cassette, cannot eject.	
A1TP3 A1TP3 A3TP3	REWIND SOLENOID	Activates rewind solenoid.	1. Rewind. 2. No rewind	1. +.2V. 2. +28V.	Cassette will not rewind	With no cassette in deck and loader down, grounding TP3 will activate solenoid.
A1TP4 A2TP4 A3TP4	LOWER HEADS	Activates heads-in solenoid.	1. Heads in or out 2. Heads in motion	1. +28V. 2. +.2V	Heads do not come in.	
A1TP5 A2TP5 A3TP5	RAISE LOADER	Activates loader solenoid.	1. Loader up or down. 2. Loader in motion.	2. +28. 2. +.2V	Loader will not raise. Cannot eject cassette.	
A1TP6 A1TP6 A3TP6	BOT PHOTO-CELL IN	Detects if tape is on clear loader.	1. Tape on clear loader. 2. Tape on oxide.	1. +5V. 2. 0V.	Cannot eject cassette, read or write.	Check photocell and photocell lamp.
A1TP7 A2TP7 A3TP7	TACH A	Detects tape motion.	Tape motion.	Sawtooth Amplitude 0 to .5V.	No tape motion.	
A1TP8 A2TP8 A3TP8	RE-WIND LATCH	Indicates deck in rewind mode.	1. Rewind selected. 2. No rewind.	1. +5V 2. 0V	Cannot rewind.	
A1TP9 A2TP9 A3TP9	DECK SELECT	Indicates deck selected.	1. Deck selected. 2. Deck not selected.	1. +5V 2. 0V	No motion.	
A1TP10 A2TP10 A3TP10	READY LATCH	Indicates deck ready.	1. Any condition except rewind. 2. Rewind.	1. 0V 2. +5V	Deck will not go ready	
A1TP11 A2TP11 A3TP11	WRITE LATCH	Indicates deck in write mode.	1. Deck in write mode. 2. Not write.	1. +5V 2. 0V	Cannot write.	
A1TP12 A1TP12 A3TP12	HIPS*	Heads-in-place latch.	Heads in.	+5V	Deck control problems.	
A1TP13 A2TP13 A3TP13	BRAKE	Controls tape.	1. Capstan halted. 2. Read or write.	1. +1V. 2. +28V.	Cannot stop or start motion.	
A4TP2	RWNDP*	Indicates re-wind cycle.	Rewind pushbutton and halt pushbutton in.	0V	Cannot select rewind from front panel.	
A4TP4	ON LINE	Selects ON LINE or OFF LINE operation.	1. ON LINE 2. OFF LINE	1. +5V 2. 0V	Cannot select ON LINE or OFF LINE from front panel.	

Table A-1. Test Points (2 of 4)

Test Point	Signal Name	Signal Function	Conditions Set For Signal Description	Signal Description	Malfunction Symptom	Troubleshooting
A4TP5	WRITP*	Selects write mode.	Write pushbutton and halt pushbutton in.	OV	Cannot select write mode from panel front.	
A4TP6	READP*	Selects read mode.	Read pushbutton and halt pushbutton in.	OV	Cannot select read mode from front panel.	
A5TP2	UP to SPEED	Indicates deck is in motion.		+5V	Cannot read or write.	
A5TP4	READ LATCH	Selects read mode.	Deck in read mode.	+5V	Read cannot be selected.	
A5TP5	UP to SPEED DLY LATCH	Indicates deck is motion.		OV	Cannot read or write.	
A5TP8	WRITE	Selects write mode.	Deck in write mode.	+5V	Cannot read or write.	
A5TP9	BOT INH LATCH	Inhibits read or write near leader/oxide splice.	1. Beginning of tape. 2. At least 10 inches past splice.	1. +5V 2. OV	Cannot read or write.	
A6TP2	ERROS	Detects error.	No error detected.	OV	Error status line always set.	
A6TP3	FILE GAP DELAY	Timer for file gap detect latch.	1. Reading character gap. 2. Reading file gap.	1. Saw-tooth 0 to .6V 2. 1.2V	Cannot search or detect file mark.	
A6TP5	SRCH*	Indicates search mode.	Search mode selected.	OV	Cannot search or detect file gap.	
A6TP7	FLAGS	Indicates flag issued.	Reading or writing.	See Figures 7-1 and 7-2 for waveforms.	On line device is waiting for flag.	
A6TP9	DRDYS	Indicates deck ready	1. Deck ready (light on). 2. Deck in operation.	1. +5V 2. OV	On line device waits for deck to go ready.	
A9TP2	REG 2 RESET*	Resets REG 2.	Writing or reading	See A10TP5		
A9TP3	REG 2 SHIFT	Shifts data up one place in REG.2	Writing character on tape.	See Figure 7-1 for waveform	Does not write.	
A9TP4	REG 1 SHIFT	Shifts data up one place in REG. 1.	Reading character from tape.	See Figure 7-1 for waveform	Does not read.	

Table A-1. Test Points (3 of 4)

Test Point	Signal Name	Signal Function	Conditions Set For Signal Description	Signal Description	Malfunction Symptom	Troubleshooting
A10TP2	SEND DATA RESET	Resets Send Data Flip-flop.	Read or write	See A6TP7	Does not read.	
A10TP3	SEND DATA	Sets Send Data Flip-flop.	1. Write. 2. Read.	1. See A10TP5 2. +5V	Does not read.	
A10TP4	SEND DATA		1. Reading. 2. Writing.	1. See Figure 7-2 for wave-form. 2. OV	Does not read.	
A10TP5	TAKE DATA	Indicates REG 1 ready to transfer data.	1. Writing 2. Reading	1. See Figure 7-1 for wave-form. 2. OV	Does not read.	
A12TP2	Counter 2 = 8	Indicates 8 bits have been written.	Writing character on tape.	See Figure 7-1 for wave-form.	Does not write.	
A12TP3	Counter 1 = 8	Indicates 8 bits have been read	Reading character on tape.	See Figure 7-2 for wave-form.	Does not read.	
A12TP7	FLAG ENABLE	Enables Flag latch.	Read or write.	OV	Flag is not sent to on-line device.	
A13TP4	WRITE 1	Sends "1" to write electronics.	Writing character on tape.	See Figure 7-1 for wave-form.	Does not write.	
A13TP6		Triggers tape read shift.	Reading character from tape.	See Figure 7-2. for wave-form.		
A13TP7	GAP T2	Detects record gap.	Reading record gap.		Does not read or search.	
A13TP8	READ TAPE SHIFT	Increments CNTRI and CNTR2 and shifts REG 1.	Reading characters from tape.	See Figure 7-2 for wave-form.	Does not read or search.	
A13TP9	GAP T1	Detects character gap.	Reading characters from tape.	See Figure 7-2 for wave-form	Does not read or search.	

Table A-1. Test Points (4 of 4)

Test Point	Signal Name	Signal Function	Conditions Set For Signal Description	Signal Description	Malfunction Symptom	Troubleshooting
A13TP10	TAPE CLOCK	Clocks write sequence.	Writing characters on tape	See Figure 7-1 for wave-form.	Does not write.	
A14TP2		Output of reproduce amplifier	Reading character.	See Figure 7-2 for wave-form.	Does not read.	
A14TP4		Input to peak detector.	Reading character.		Does not read.	
A14TP6		Input to bi-polar flip-flop.	Reading character.	See Figure 7-2 for wave-form.	Does not read.	
A15TP2	WRITE HEAD 3	Write signal.	Writing character.		Transport motion and write mode indicated, but no character written.	
A15TP3	WRITE HEAD 3	Write signal.	Writing character.			
A15TP4	WRITE HEAD 3	Write signal.	Writing character.	OV.		
A15TP5	READ DATA 3	Read 3 preamplifier output.	Reading character.	See A15TP10		
A15TP6	WRITE HEAD 2	Write signal.	Writing character.	OV.		
A15TP7	READ	Read 2 preamplifier output.	Reading character	See A15TP10		
A15TP8	WRITE HEAD 1	Write signal.	Writing character.	OV.		
A15TP9	READ DATA 1	Read 1 preamplifier output.	Reading Character.	See A15TP10		
A15TP10	MPX DATA	Selected read preamplifier.	Reading character.	See Figure 7-2 for wave-form.	Cannot read.	
A15TP11	WRITE HEAD 3	Write signal to Head 3.	Writing character.	See Figure 7-1 for wave-form.	Transport motion and write mode indicated, but no character written.	
A15TP12	WRITE HEAD 3	Write signal to Head 3.	Writing character.	See A15TP11		

APPENDIX B

RESTORING THE PROTECTED BINARY CASSETTE LOADER

To load the 85001A Protected Binary Cassette Loader (PBCL) into the protected area of memory:

1. Load the following instructions through the switch register starting at address 22_8 :

(22)	064050	(40)	1037cc
(23)	014035	(41)	1023cc
(24)	001727	(42)	024041
(25)	070052	(43)	1025cc
(26)	014035	(44)	010047
(27)	030052	(45)	124035
		(46)	004400*
(30)	170001	(47)	000377
(31)	006004		
(32)	054051	(50)	0x7700
(33)	102077	(51)	mm0000
(34)	024023		
(35)	000000		
(36)	060046		
(37)	1026cc		

*Change this number if you want to change the deck from which the PBCL will be read into core. Refer to Appendix C.

cc = I/O channel for the 85001A

x = 1 for 8K memory
 2 for 12 K memory
 3 for 16 K memory
 5 for 24K memory
 7 for 32K memory

mm = 02 for 8 K memory
 03 for 12K memory
 04 for 16 K memory

2. LOAD ADDRESS 22_8 .
3. Put the Bootloader Cassette into Deck 1 and position to the proper file (if necessary).
4. ENABLE the LOADER.
5. Press PRESET and then press RUN.
6. The computer should halt with a 102077_8 in the T-register. PBCL is now in protected core.

Table B-1. Contents of PBCL

	0	1	2	3	4	5	6	7
0x7700	063767	106501	004010	002400	073727	017733	001727	003000
0x7710	073774	017733	073775	070001	037774	027722	017733	050001
0x7720	017742	102011	063775	043770	002021	102055	017733	000000
0x7730	044000	037775	027714	000000	017742	001727	073776	017742
0x7740	033776	127733	000000	063773	1026cc	1037cc	1023cc	027746
0x7750	1025cc	002020	102013	001222	002021	027761	1067cc	067771
0x7760	024001	001722	002020	027705	1025cc	013772	127742	173775
0x7770	1n0100	102077	000377	004400*	000000	000000	000000	000000

x = 1 for 8K
 2 for 12K
 3 for 16K
 5 for 24K
 7 for 32 K

cc = I/O channel for the 85001A Cassette Input/Output Unit

n = 6 for 8K
 5 for 12K
 4 for 16K
 2 for 24K
 0 for 32K

*Modification of this instruction will result in altering the deck number from which the PBCL loads

005000 PBCL loads from Deck 2.
 005400 PBCL loads from Deck 3.

APPENDIX C CHANGING INPUT DECKS

INPUTTING THE BOOTLOADER CASSETTE FROM ANOTHER DECK

Use the following procedure to load PBCL from another deck:

1. Perform the procedure in Appendix B, but change the instruction in address 46 (octal) from the usual 004400 for Deck 1 to 005000 for Deck 2 or 005400 for Deck 3.
2. Load the PBCL through the selected deck.

LOADING ABSOLUTE TAPES FROM ANOTHER DECK

Use the following procedure to load absolute tapes from another deck:

1. ENABLE the LOADER switch.
2. Enter the appropriate “word” from Table C-1; select the “word” by core size of the computer and the number of the desired input deck. Load the “word” into core at the address shown (depending on the computer’s core size).

Table C-1. Changing Input Decks

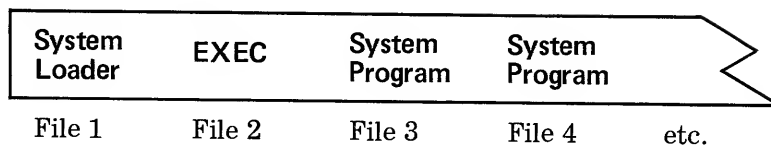
Core Size	Address	To load from		
		Deck 1	Deck 2	Deck 3
8K	017773	004400	005000	005400
12K	027773	same	same	same
16K	037773	same	same	same
24K	057773	same	same	same
32K	077773	same	same	same

3. PROTECT the LOADER

APPENDIX D

LOADING SYSTEM TAPES

A system tape is structured as follows:



The system tape must have the System Loader in the first file and the EXEC in the second file.

Use the following procedure to load the EXEC if the System Loader is not in core; if the System Loader is in core, skip to step 7.

1. Make sure all I/O peripherals are on.
2. Press HALT on the computer.
3. Insert the system tape into Deck 1 and ready the deck. Press ON LINE on the 85001A.
4. LOAD ADDRESS 0x7700₈. ENABLE the LOADER.

x	=	1 for 8K
		2 for 12K
		3 for 16K
		5 for 24K
		7 for 32K

5. Press PRESET and then press RUN. When the computer HALTs, the System Loader is in core and ready to run (it will halt with 102077 (octal) in the T-Register).
6. PROTECT the LOADER.
7. LOAD ADDRESS 0x7500₈ (x must be the same as x in step 4).
8. Press PRESET and then press RUN.

The System Loader will rewind Deck 1 to File 1, and then skip to File 2. It will then load and execute File 2. The print-out device will then print out EXEC >> and wait for a command (see Appendix F).

The EXEC may be restarted by loading address 100 (octal) and pressing RUN.

APPENDIX E

LOADING ABSOLUTE PROGRAMS WITHOUT THE EXEC

Use the following procedure to load an absolute program without the EXEC:

1. Insert the cassette into Deck 1. Press the loader down. The READY lamp above the deck will illuminate.
2. Select a file. If the program desired is stored in File 1, go to step 3. To select any other file, skip the preceding files by pressing OFF LINE and READ together (once for each file to be skipped). Both READ and HALT lamps will illuminate while skipping over the file, and just the HALT lamp will stay lit after each file is skipped.
3. Press ON LINE.
4. LOAD ADDRESS $0x7700_8$. ENABLE the LOADER.

$x = \begin{array}{l} 1 \text{ for } 8K \\ 2 \text{ for } 12K \\ 3 \text{ for } 16K \\ 5 \text{ for } 24K \\ 7 \text{ for } 32K \end{array}$
5. Press PRESET and then press RUN. When the computer HALTs, the program is in core (it will halt with 102077 (octal) in the T-Register).
6. PROTECT the LOADER.
7. To start running the program, LOAD ADDRESS the computer to the starting address of the program, press PRESET and then press RUN.

Table E-1. Error Halts Loading Absolute Tapes

Halt	Explanation
102011	Check sum error; check the tape for lint, dust, or other particles. Detected by computer.
102013	Tape error; check the tape for creases or ragged edges. Detected by <u>85001A</u> .
102055	Address error; check to be sure you used the proper tape. Detected by computer.

APPENDIX F

USING THE EXEC

The 85001A Executive (EXEC) provides operator control of the Cassette Operating System (COS). The hardware side of the COS consists of the computer and the 85001A Cassette Input/Output Unit. The EXEC is useful for troubleshooting because of its 85001A control capability. For example, the EXEC can be used to write ASCII characters on tape and then the characters can be read back to verify READ/WRITE operation. The EXEC may also be used to SEARCH, write FILE MARKS, etc.

Refer to Appendix D to load the EXEC into core. The EXEC provides commands to allow the operator to exercise the Cassette Operating System. Table F-1 describes the EXEC commands.

Table F-1. EXEC Commands

LIST F FROM A	<p>Lists ASCII characters from Deck A File F onto the print-out device; list stops at an End-of-File (EOF). Lift switch 0 on the computer's switch register to bail-out of the listing.</p> <p>If deck is not specified, the EXEC reads from Deck 2.</p> <p>If file is not specified, the EXEC reads from the next file on the specified deck.</p>
DUMP F FROM A	<p>Dumps binary data from Deck A File F onto the print-out device in octal format; dump stops at an End-of-File (EOF). Lift switch 0 on the computer's switch register to bail-out of the listing.</p> <p>If deck is not specified, the EXEC reads from Deck 2.</p> <p>If file is not specified, the EXEC reads from the next file on the specified deck.</p>
POS F ON A	<p>Positions the tape up to the beginning of File F on Deck A. If deck is not specified, the EXEC will position File F on Deck 2.</p>
WRITE F ON A	<p>Writes ASCII characters from the keyboard onto Deck A File F. After the WRITE command is given, type in the line to be inputted to the cassette; follow the line by typing a carriage return (CR).</p> <p>Type Control—C (C^c) followed by a carriage return (CR) to bring the program back to EXEC>>.</p> <p>The EXEC will remind you to write an End-of-File (EOF). See WEOF.</p>
WEOF ON A	<p>Writes and End-of-File (EOF) mark on the current file in Deck A.</p> <p>See discussion of WEOF at the end of this table.</p>

Table F-1. EXEC Commands (cont'd)

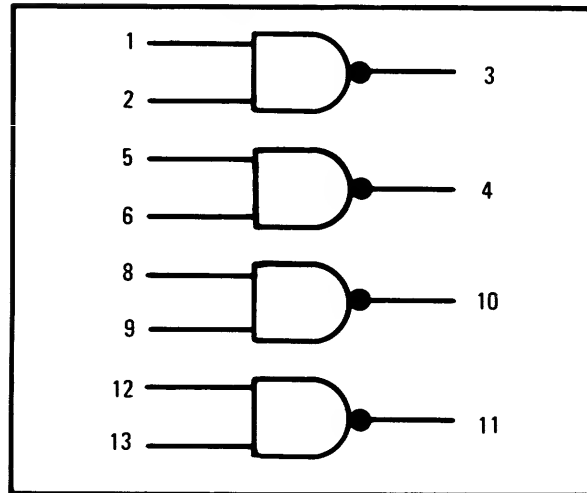
FILE F ON A	<p>Files a portion of the computer's core memory onto File F of Deck A. The deck must be specified. If the file is not specified, the EXEC will file on the next file on the specified deck.</p> <p>The data filed is in absolute format.</p> <p>After accepting the FILE command, the EXEC will ask:</p> <p style="text-align: center;">FIRST CORE LOC?</p> <p>Answer with the starting address of the portion of core to be filed. Answer in octal.</p> <p>If the number typed was an invalid number, the EXEC will respond with:</p> <p style="text-align: center;">INVALID COMMAND</p> <p>If answer was valid, the EXEC then asks for the octal address of the last location to be filed:</p> <p style="text-align: center;">LAST CORE LOC?</p> <p>If answer is valid, the EXEC files the portion of core selected. The EXEC then reminds you to write an End-of-File (EOF) mark by printing out:</p> <p style="text-align: center;">WEOF? EXEC</p> <p>If the answer to the LAST CORE LOC? was greater than the answer to the FIRST CORE LOC? question, the EXEC will print out:</p> <p style="text-align: center;">FIRST > LAST</p> <p>and then will ask for the first core location again.</p>
LOAD F FROM A	<p>Loads File F on Deck A into core and begins executing the program contained in the file.</p> <p>The EXEC uses the System Loader to load the program into core memory. The System Loader assumes that the first record on the file to be loaded is the starting address of the program. The EXEC transfers program control to that starting address after loading.</p> <p>To return to the EXEC>> question, the EXEC must be reloaded with the System Loader, unless the program just loaded has some feature for returning to the EXEC. All BCS-processed programs return to EXEC; to add the return feature to absolute programs, use the following coding:</p> <p style="text-align: center;">JMP SYSLD, I SYSLD OCT x7500 X = 1 for 8K 2 for 12K 3 for 16K</p>
COPY N FROM A	<p>Copies N files from Deck A onto Deck 3. Deck A may be either 1 or 2, (but NOT 3); copies will always be written on Deck 3.</p> <p>Use a POS command to set the tape in position. Command COPY copies N number of files beginning with the current file on the specified deck.</p>

Table F-1. EXEC Commands (cont'd)

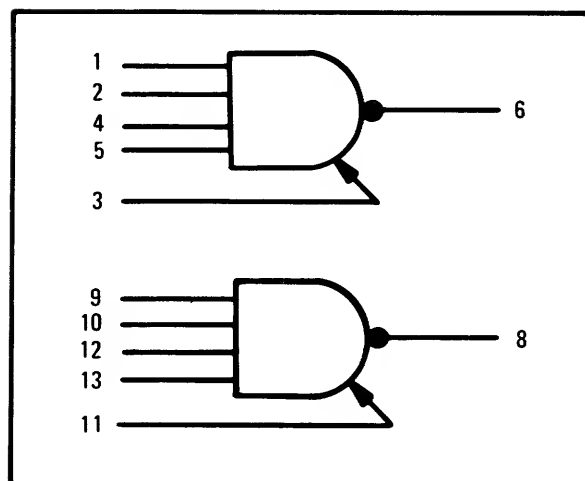
COPY N FROM A	COPY FROM A or COPY O FROM A causes the EXEC to copy only one file; the EXEC will not output an End-of-File (EOF) mark onto Deck 3 after the file has been copied, so COPY may be used to merge two files.
COMP N ON A	Compares N files on Deck A with N files on Deck 3. Use COMP to verify tapes after they have been copied.
SKIP N ON A	Skips N files on Deck A. If the deck is not specified, the EXEC will skip N files on Deck 2. The EXEC will return to the EXEC>> question if you command SKIP ON A or SKIP O on A.
EXEC	Loads the EXEC from File 2 of Deck 1 into core memory and then executes it. The EXEC responds to the command with EXEC>>. Answer with a command.
CLEAR	In a CRT-based system, CLEAR clears the screen and responds with EXEC>>. In a non-CRT-based system, CLEAR simply produces the EXEC>> question.
SYST	Lists the names of the programs on the current EXEC system tape. May be used to prepare a new system tape.
WEOF	Writes an End-of-File (EOF) mark after anything just written or filed. The EXEC does not automatically write the EOF mark because there may be times when it is desired to write or file data in several sections. For example, you may wish to write A and then go elsewhere to pick up B, and then file B behind A before writing the EOF mark.

APPENDIX G

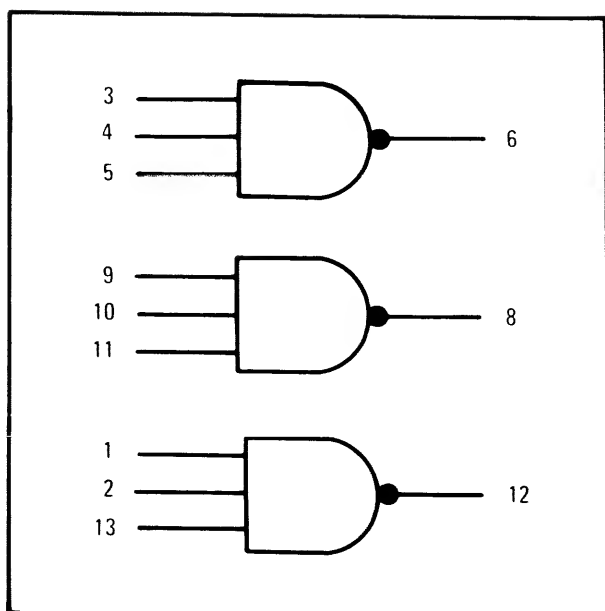
IC BASE PINOUT DIAGRAMS



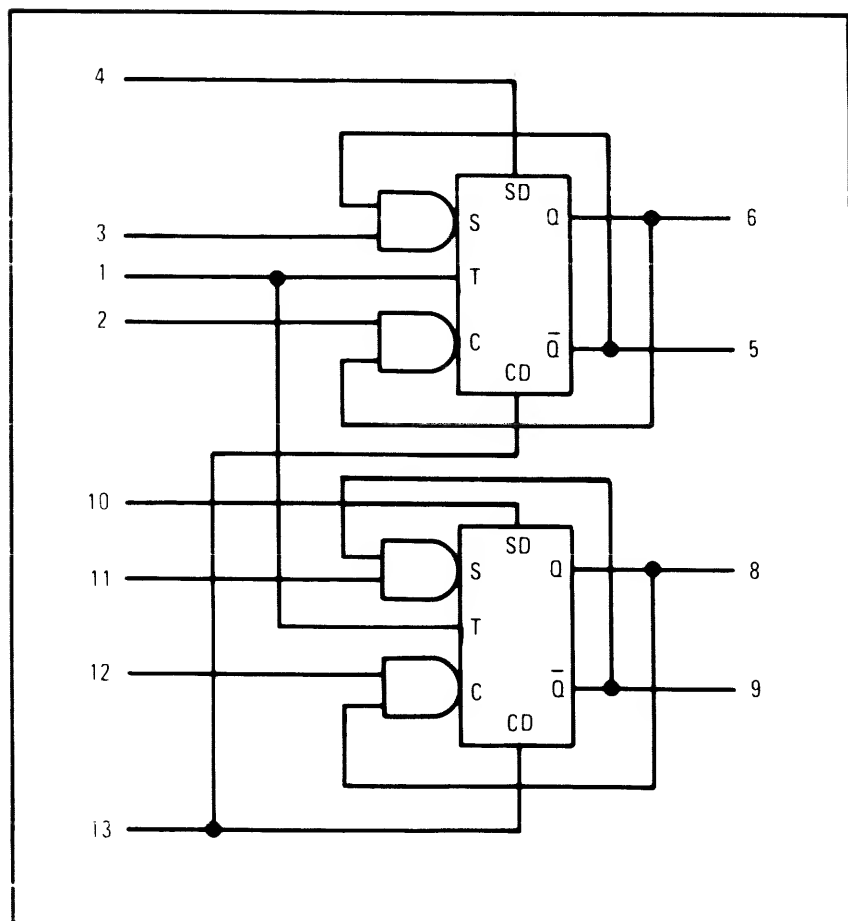
MC858P
HP 1820-0256



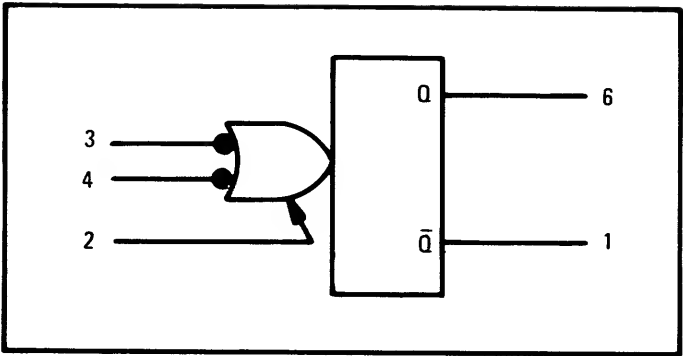
MC830P
HP 1820-0086



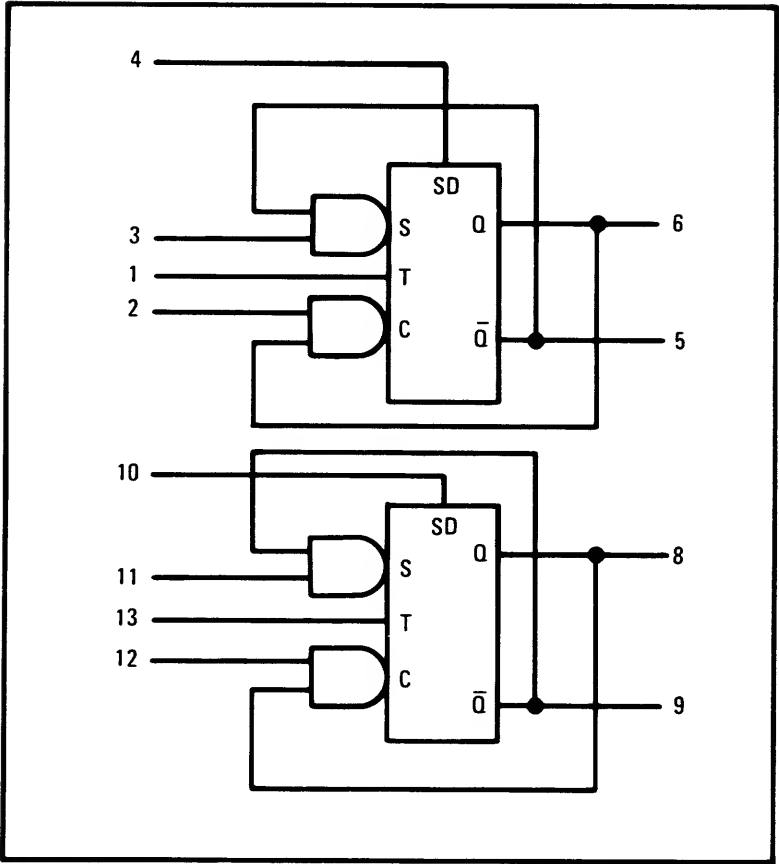
MC862P
HP 1820-0310



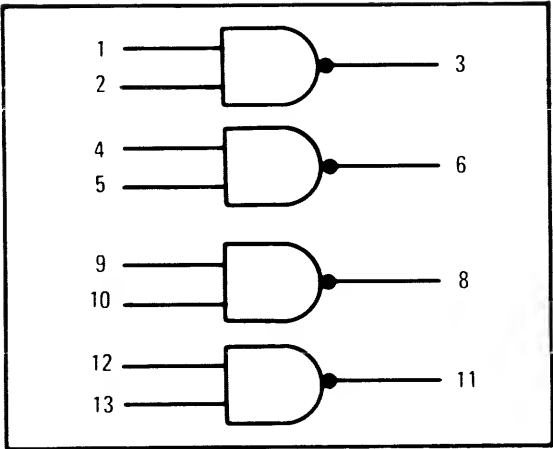
MC852P
HP 1820-0258



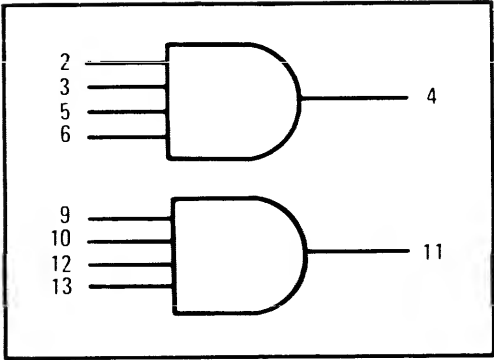
MC851P
HP 1820-0088



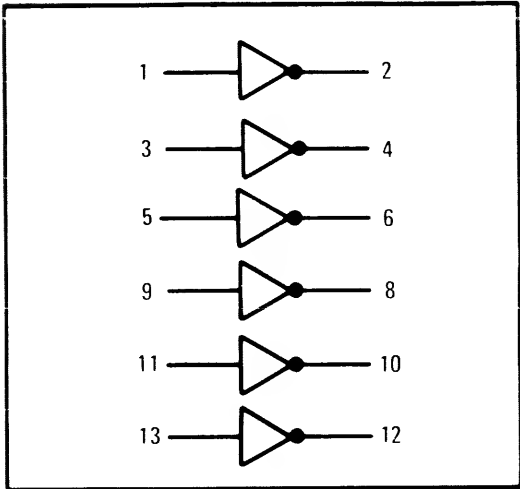
MC853P
HP 1820-0122



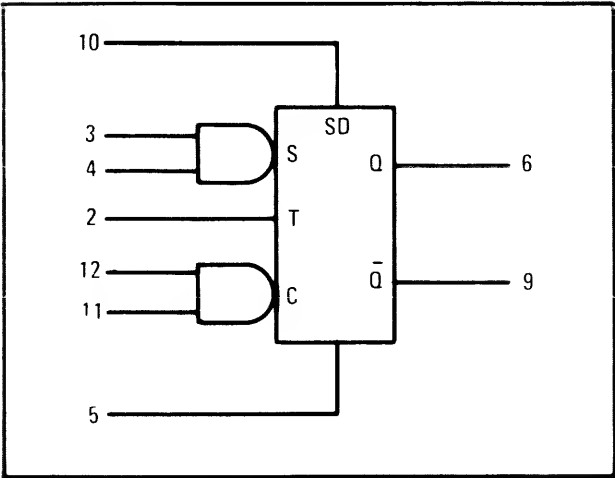
MC846P
HP 1820-0094



MC833P
HP 1820-0346



MC836P
HP 1820-0307



MC845P
HP 1820-0308

APPENDIX H

12849A INTERFACE CARD

The 12849A acts as an interface between the computer and the Cassette Input/Output Unit. The following modifications are made to the 12849A:

W1 to A is connected
W2 to C is connected
W2 to B is removed
W3 to B is connected

W4 to B is connected
W5 through W8 are removed
W9 to A is connected.

The only difference between the presently used 12849A and the formerly used 12566A is a trace between MC85 Pin 1 and the I/O device connector Pin 21.

The cable between the 12849A Interface Card and the 85001A Cassette Input/Output Unit is HP Part No. 85001-60001. The wiring of this cable is shown in Table H-1.

Table H-1. Cable Wiring

Conn. A Pin	Conn. B Pin	Remarks	Conn. A Pin	Conn. B Pin	Remarks
A	A	BLK-NDAT0-I	1	M	GRA-ODAT0-I
B	B	BRN-NDAT1-I	2	N	WHT/BLK-ODAT1-I
C	C	RED-NDAT2-I	3	P	WHT/BRN-ODAT2-I
D	D	ORN-NDAT3-I	4	R	WHT/RED-ODAT3-I
E	E	YEL-NDAT4-I	5	S	WHT/ORN-ODAT4-I
F	F	GRN-NDAT5-I	6	T	WHT/YEL-ODAT5-I
H	H	BLU-NDAT6-I	7	U	WHT/GRN-ODAT6-I
J	J	VIO-NDAT7-I	8	V	WHT/BLU-ODAT7-I
K	m	*WHT/BLK/VIO-DKSOC-I	9	y	WHT/VIO-DRDYS-I
L	n	*WHT/BLK/GRA-DKS1C-I	10,23	z	*WHT/RED/ORN-FLAGS-I
M	p	*WHT/BRN/RED-WRITC-I	11	AA	WHT/GRA-WRITS-I
N	r	*WHT/BRN/ORN-READC-I	12	BB	WHT/BLK/BRN-READS-I
P	s	*WHT/BRN/YEL-HALTC-I	13	CC	WHT/BLK/RED-L/OXS-I
R	t	*WHT/BRN/GRN-RWNC-I	14	DD	WHT/BLK/ORN-FILMKS-I
S	u	*WHT/BRN/BLU-FLMKC-I	15	EE	WHT/BLK/YEL-WLKOS-I
T	v	*WHT/BRN/VIO-SRCHC-I	16	FF	WHT/BLK/GRN-ERROS-I
Z, 22	K, W, k	*WHT/BRN/GRA-NDATT-I ODATT-I CMDT-I	19,21 24,28	f x, L X, Y Z, a j, w	WHT-INTLZ-I *Use one white wire from pairs for each of these if desired.
				HH	GRND

APPENDIX I

CLEANING THE TAPE PATH

HEAD AND BUFFER SPRING

1. Lower the Loader Assembly.
2. Wet a cotton swab with Isopropyl Alcohol or Freon.
3. Insert the cotton swab into the loader opening and, using the EOT/BOT lamp as illumination, wipe off the Read/Write head (located to the rear and to the right of the lamp). Be careful not to bump the lamp.
4. Wipe off the Buffer Spring Assembly (the shiny metal object to the right and just inside the loader).
5. Wipe off the residue lying about in the Loader Assembly.

PINCH ROLLER

1. Remove the screws securing the top cover.
2. Remove top cover, and wet a cotton swab with water. Remove excess water.
3. Place the desired deck in OFF-LINE READ while holding the switch in the center of the Tape Transport Module clear plastic lid depressed.
4. Place the wetted cotton swab behind the rotating pinch roller.
5. Release the cassette in place switch and wipe off the capstan.

CAUTION: DO NOT ALLOW THE COTTON SWAB TO BE PULLED INTO THE CAPSTAN.

